KIPOR

KIPOR POWER PRODUCTS CO., LTD.

IG1000 SHOP MANUAL

EPA/CARB/CETL Certified Models

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Kipor Power Systems, Inc.

Revision 4, July, 2011

Preface

This manual covers the construction, function and servicing procedures of the KIPOR IG1000.

This manual is applicable to all models certified by the California Air Resources Board (CARB) and EPA/CETL built from December 2008 onward. The construction of both generators is identical but CARB model fuel systems use certified materials. Procure the correct parts applicable to your model.

Models with production dates of 2011 feature overload reset switches and a parallel version is now available.

Careful observance of the instructions contained in this manual will result in safe and quality maintenance and repair work.

All information, illustrations, directions and specifications included in this publication are based on the latest product information available at the time of approval for printing.

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1. SPECIFICATIONS and WIRING DIAGRAM

1.1 SPECIFICATIONS

Dimensions and weights

Model	IG1000/IG1000P
Overall Length in (mm)	18.1 (460)
Overall Width in (mm)	9.8 (248)
Overall Height in (mm)	15.6 (395)
Net Weight in (Kg)	30.8 (14)

Engine

Model	KG144
Type	4-stroke,OHV, single cylinder, Gasoline engine
Displacement cu in. (cc)	3.3 (53.5)
Maximum horsepower/rpm	1.3/5500
Compression ratio	8.5:1
Cooling system	Forced air-cooled
Ignition system	T.C.I
Ignition timing	29°B.T.D.C
Spark plug	UR5
Carburetor	Float type, Horizontal, butterfly valve type
Air cleaner	Semi-dry type
Governor	Electronic control
Lubrication system	Forced splash
Oil capacity qt (L)	.19 (0.22)
Starting system	Recoil starter
Stopping system	Primary circuit ground
Fuel	Automotive unleaded gasoline 87 octane

Alternator

Model	KD10
Generator type	Multi pole rotation
Generator structure	Self-ventilation drip-proof alternator
Excitation	Self-excitation (Magnet type)
Voltage regulation system	Plush width modulation
Phase	Three phase
Rotating direction	Clockwise (Viewed from the generator)
Frequency regulation	AC-DC-AC conversion

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Performance

Model		IG1000
Maximum output AC		1.0KVA
Rated output AC		0.9KVA
Rated output DC		100W
Rated frequency		60HZ
Rated voltage AC		120V
Rated voltage DC		12V
Rated current AC		7.5A
Rated current DC		8.3A
Power factor		1.0
Voltage variation rate	Momentary	10%max.
	Average	1.5%max.
	Average time	3 sec. max.
Voltage stability		±1%
Frequency variation rate	Momentary	1%max.
	Average	1%max.
	Average time	1 sec. max.
Frequency stability		±0.1%
Insulation resistance		10MΩ min.
AC circuit protector		8.8 A
DC circuit protector		10 A
Fuel tank capacity-gal (L)		.69 (2.6)
Operating hours		4
Noise level NL-FL @ 23' (7 m)		60-65 dB

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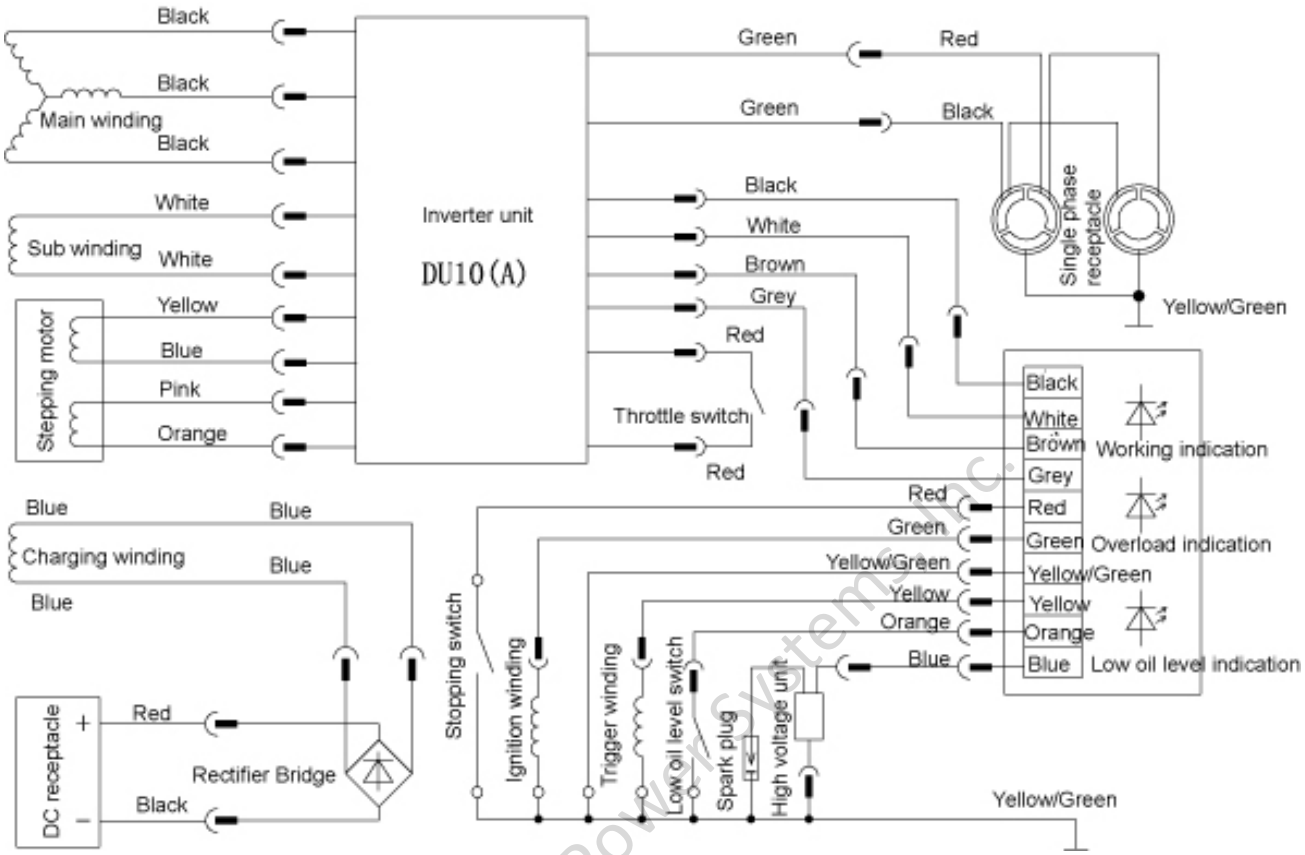
1.2 WIRING DIAGRAM IG1000 through 2010 Model Year



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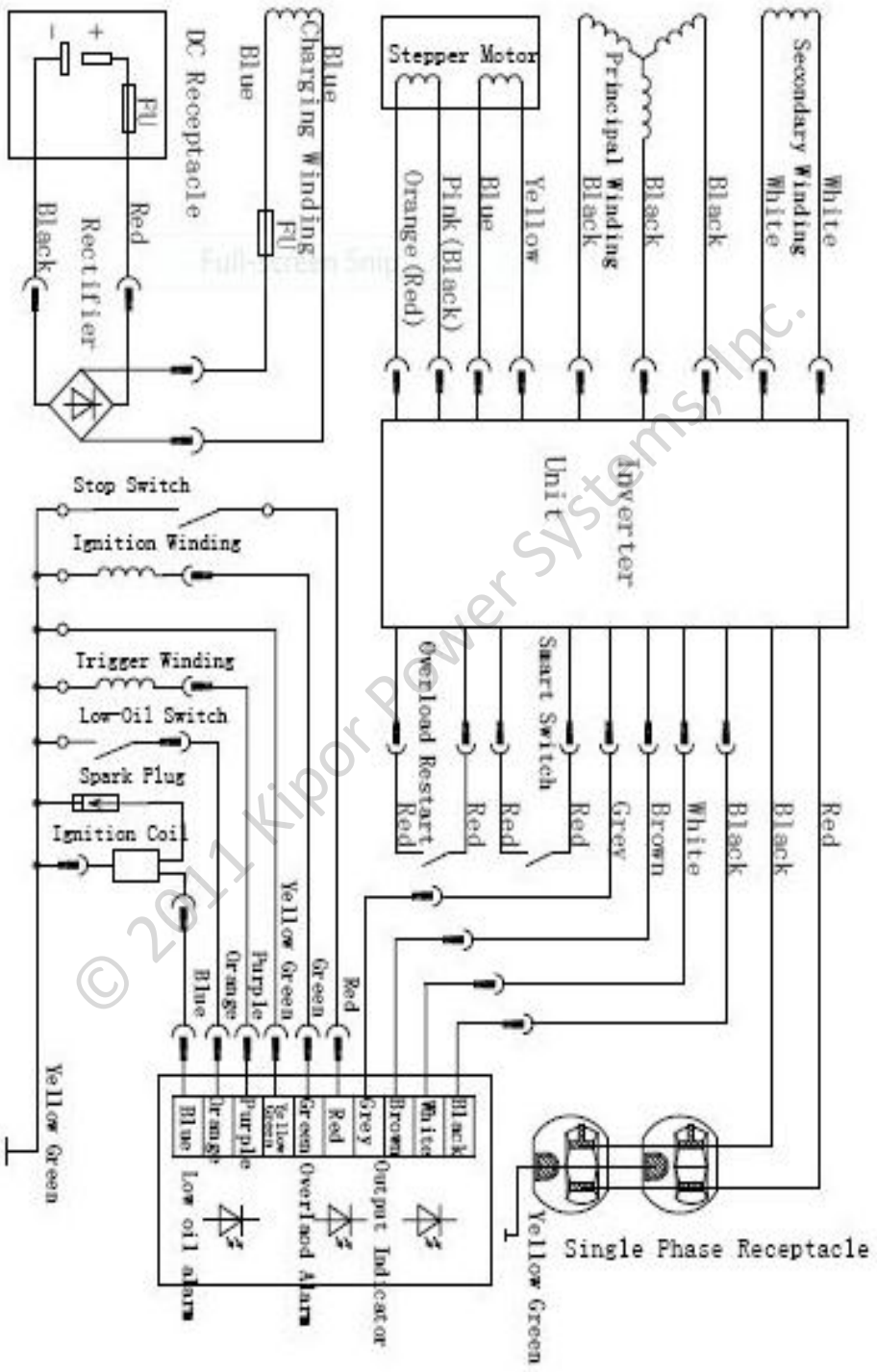
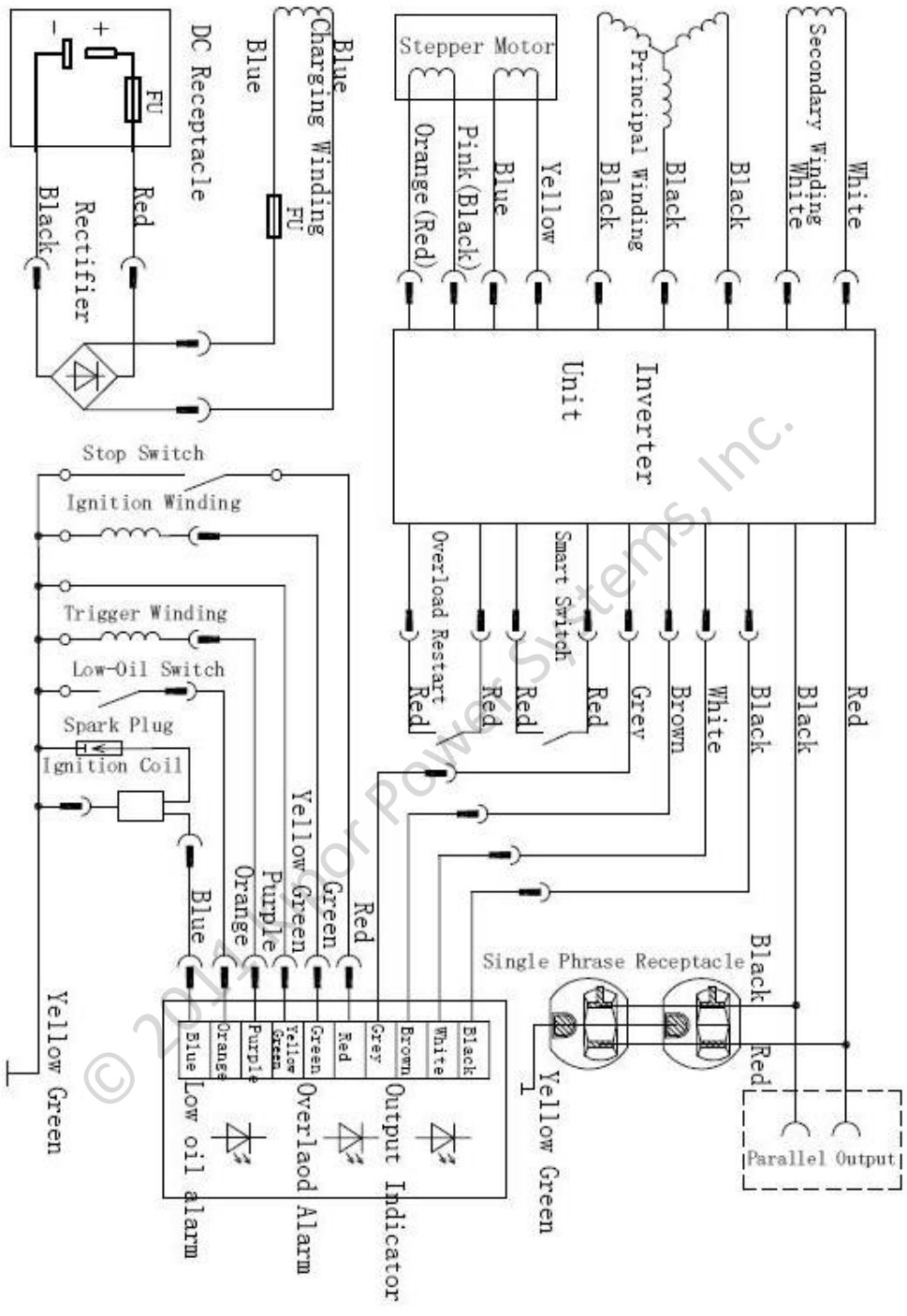
IG1000 2011 Forward



IG2000P 2011 forward



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2. SERVICE INFORMATION

2.1 The importance of proper servicing

Proper servicing is essential to the safety of the operator and the reliability of the generator. Any error or oversight made by the technician while servicing can easily result in faulty operation and/or damage to the equipment or injury to the operator.

⚠ Warning

Improper servicing can cause an unsafe condition that can lead to serious injury or death.
Follow the procedures and precautions in this shop manual carefully.

Some of the most important precautions are stated below.

2.2 Important safety precautions

Be sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and safety equipment. When performing maintenance or repairs, be especially careful of the following:

- Read the instructions before you begin, and be sure you have the tools and skills required to perform the tasks safely.

- Be sure that the engine is off before you begin any maintenance or repairs. This will reduce the possibility of several hazards:

- Carbon monoxide poisoning from engine exhaust.
- Burns from hot parts.
- Injury from moving parts.

- Do not run the engine unless the instructions tell you to do so. Keep your hands and clothing away from rotating parts.

- To reduce the possibility of fire or explosion, exercise extreme caution when working around gasoline. Use only a nonflammable solvent, not gasoline, to clean parts. Keep cigarettes, sparks and flames away from all fuel-related parts.

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2.3 Service rules

- Use genuine KIPOR or KIPOR-recommended parts and lubricants or their equivalents. Parts that do not meet Kipor's design specifications may damage the engine.

- Use the special tools designed for the product.

- Always install new gaskets, O-rings, etc. when reassembling components.

- Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly. After reassembly, check all parts for proper installation and operation.

- Many screws used in this machine are self-tapping. Be aware that cross-threading or over tightening these screws will strip the threads and ruin the hole.

- Use only metric tools when servicing this engine. Metric bolts, nuts and screws are not interchangeable with non metric fasteners. The use of incorrect tools and fasteners will damage the engine.

2.4 Electrical precautions

- Hold the connector body to disconnect the connector. Do not disconnect by pulling the wire harness. To disconnect the locking connector, be sure to unlock first, and then disconnect.

- Check the connector terminals for bend, excessive extrusion, missing terminals, or other abnormalities before connecting the connector.

- To connect, insert the connector as far as it goes. If the connector is a locking type, be sure that it is locked securely.

- Check the connector cover for breakage and check whether the connector female terminal is not opened excessively. Then, connect the connector securely. Check the connector terminal for rust. Remove the rust using an emery paper or equivalent material before connecting the connector.

- Set the harness clips in the specified places of the frame securely, and secure the wire harnesses.

- Clamp the cables securely.

- Clamp the wire harnesses securely so that they do not interfere with the rotating parts, moving parts and hot parts.
- Route and connect the wire harnesses properly. Be sure that the harnesses are not slack, twisted or pulled overly taut.

- Route the wire harnesses properly so that they do not contact sharp edges and corners and the end of the bolts and screws on the body.

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- If a wire harness must contact the end of the bolts or screws or sharp edges and corners, protect the contact part of the harness with a loom or by winding with electrical insulating tape. If the wire harness has a grommet, set the grommet securely.
- Take care not to pinch the wire harnesses during installation of a part. If a wire harness has damaged insulation, repair by winding with electrical insulating tape.

- When using an electrical tester like a volt/ohm meter or clamp on meter, read the manufacturer's operating instructions carefully before operating the tester. Be sure that the tester battery is fully charged and the meter is functioning properly

2.5 Serial number

The generator serial number identifies your particular unit and is important when ordering parts and accessories. It is also used by your dealer and distributor for warranty administration.

The generator serial number is stamped on the engine block to the right of the oil dipstick. It is also on a label on both ends of the generator carton as well as the certificate of quality.

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2.6 Maintenance standards

Part	Item		Standard(mm)	Service limit
Engine	Maximum speed without load		5500±100 rpm	—
Cylinder	Sleeve I.D.		1.712-1.714 in	1.716 in
			43.500-43.520 mm	43.595 mm
Piston	Skirt O.D		1.711-1.712 in	1.707 in
			43.460-43.480 mm	43.350 mm
	Pin bore I.D.		0.3937-0.3940 in	0.3955 in
			10.002-10.008 mm	10.050 mm
Piston pin	O.D		0.3934-0.3937 in	0.3920 in
			9.994-10.000 mm	9.950 mm
Piston ring	1st ring	Height	0.030-0.031 in	0.028 in
			0.77-0.79 mm	070 mm
		Ring side clearance	0.0008-0.0024 in	0.0059 in
			0.02-0.06 mm	0.15 mm
		Ring end clearance	0.0039-0.0098 in	0.0314
			0.10-0.25 mm	0.80 mm
		Width	0.063-0.071 in	0.055 in
			1.60-1.80 mm	1.40 mm
	2nd ring	Height	0.038-0.039 in	0.0354 in
			0.97-0.99 mm	0.90 mm
		Ring side clearance	0.0008-0.0024 in	0.0059 in
			0.02-0.06 mm	0.15 mm
		Ring end clearance	0.0039-0.0098 in	0.0314
			0.10-0.25 mm	0.80 mm
		Width	0.071-0.078 in	0.063 in
			1.80-2.00 mm	1.60 mm
	Oil ring	Height	0.053-0.058 in	0.049 in
			1.35-1.48 mm	1.25mm
		Ring side clearance	0.0008-0.0067 in	0.0090 in
			0.02-0.17 mm	0.23 mm
		Ring end clearance	0.0079-0.1180 in	0.0354 in
			0.20-0.30 mm	0.90 mm
		Width	0.3942-0.3946 in	0.3965 in
			2.00-2.40 mm	1.80 mm
Connecting rod	Small end I.D		0.3942-0.3946 in	0.3965 in
			10.012-10.024 mm	10.070 mm
	Big end I.D		0.5911-0.5915 in	0.5937 in
			15.015-15.025 mm	15.080 mm
Crankshaft	Crank pin O.D.		0.5896-0.5899 in	0.5866 in
			14.975-14.985 mm	14.900 mm
Valves	Valve clearance	Intake	0.0031-0.0039 in	---
			0.08-0.10 mm	---
		Exhaust	0.0039-0.0059 in	---
			0.10-0.15	---
	Stem O.D.	Intake	0.156-0.157 in	0.1535 in

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			3.965—3.980 mm	3.900 mm
		Exhaust	0.1557-0.1562 in	0.1540 in
			3.955—3.970 mm	3.900 mm
	Guide I.D.	IN/EX	0.1575-0.1579 in	0.2598 in
			4.000—4.012 mm	4.060 mm
Valve spring	Free length	IN/EX	0.925 in	0.866 in
			23.5 mm	22 mm
Cam wheel	Cam height		1.101-1.103 in	1.062 in
			27.97-28.03 mm	26.97 mm
Camshaft	O.D		0.1963-0.1967 in	0.1949 in
			4.988-4.996 mm	4.950 mm
	Camshaft bearing I.D.		0.1976-0.1988 in	0.2008
			5.02-5.05 mm	5.10 mm
Rocker arm	I.D(Rocker arm)		0.1575-0.1579 in	0.2598 in
			4.000-4.012 mm	4.050 mm
	O.D.(Rocker arm shaft)		0.1574-0.1579 in	0.1590 in
			3.988-3.996 mm	3.950 mm
	I.D.(Rocker arm shaft bearing)		0.1574-0.1579 in	0.1594 in
			4.000-4.012 mm	4.050 mm
Spark plug	Gap		0.024-0.028 in	—
			0.6—0.7 mm	—
Ignition coil	Resistance	Primary side	0.8—1.3 Ω	—
		Second side	15 —21 kΩ	—
Pulse coil (Trigger)	Air gap		0.020-0.0295 in	—
			0.5-0.75 mm	—
	Resistance		80～130Ω	—

Part	Item	Type	Standard (Ω)
Ignition winding	Resistance	Green-Yellow/Green	0.50-0.70
Outer charging winding	Resistance	Blue--Blue	0.16-0.20
Sub winding	Resistance	White—White	0.25-0.35
Main winding	Resistance	Black—Black	2.0-3.0

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2.7 Torque values

Item	Specification	Tightening torque	
		Ft lb.	N·m
Connection rod bolt	M5X0.8X25	5.9-7.4	8-10
Spark plug	M10X1.0X13		11-13
Flywheel nut	M10X1.25		48-52
Standard torque	M5 Bolt, nut	4.4-6.0	6-8
	M6 Blot, nut	5.9-7.4	8-10

Note: Use standard torque values for fasteners that are not listed in this table.

3. Troubleshooting

This troubleshooting section contains troubleshooting trees organized by common groups of symptoms. Some testing information is contained in these sections. The following chapters of this manual focus on individual components and sub assemblies which will give you the assembly and reassembly procedures along with detailed specifications and testing procedures.

3.1 General symptoms and possible causes

Engine does not start or hard starting	Fuel filter clogged	Clean
	Fuel tank tube clogged	Clean
	Fuel switch clogged	Clean
	Carburetor faulty	Readjust and clean
	Ignition coil faulty	Inspect and replace
	Spark plug faulty	Inspect and replace
	Trigger faulty or trigger clearance faulty	Inspect and replace
	Spark plug cap looses	Fix it securely
	Low oil alarm faulty	Inspect and replace
	Ignitor faulty	Inspect and replace
	Ignition winding faulty	Inspect and replace
	Throttle opening fault	Set in fully close or half close position
Engine speed does not stabilize, too high or too low	Carburetor faulty	Adjust and/or disassemble and clean
	Throttle control motor (stepping motor) faulty	Inspect and replace
	Inverter unit faulty	Inspect and replace
	Valve clearance misadjusted	Readjust

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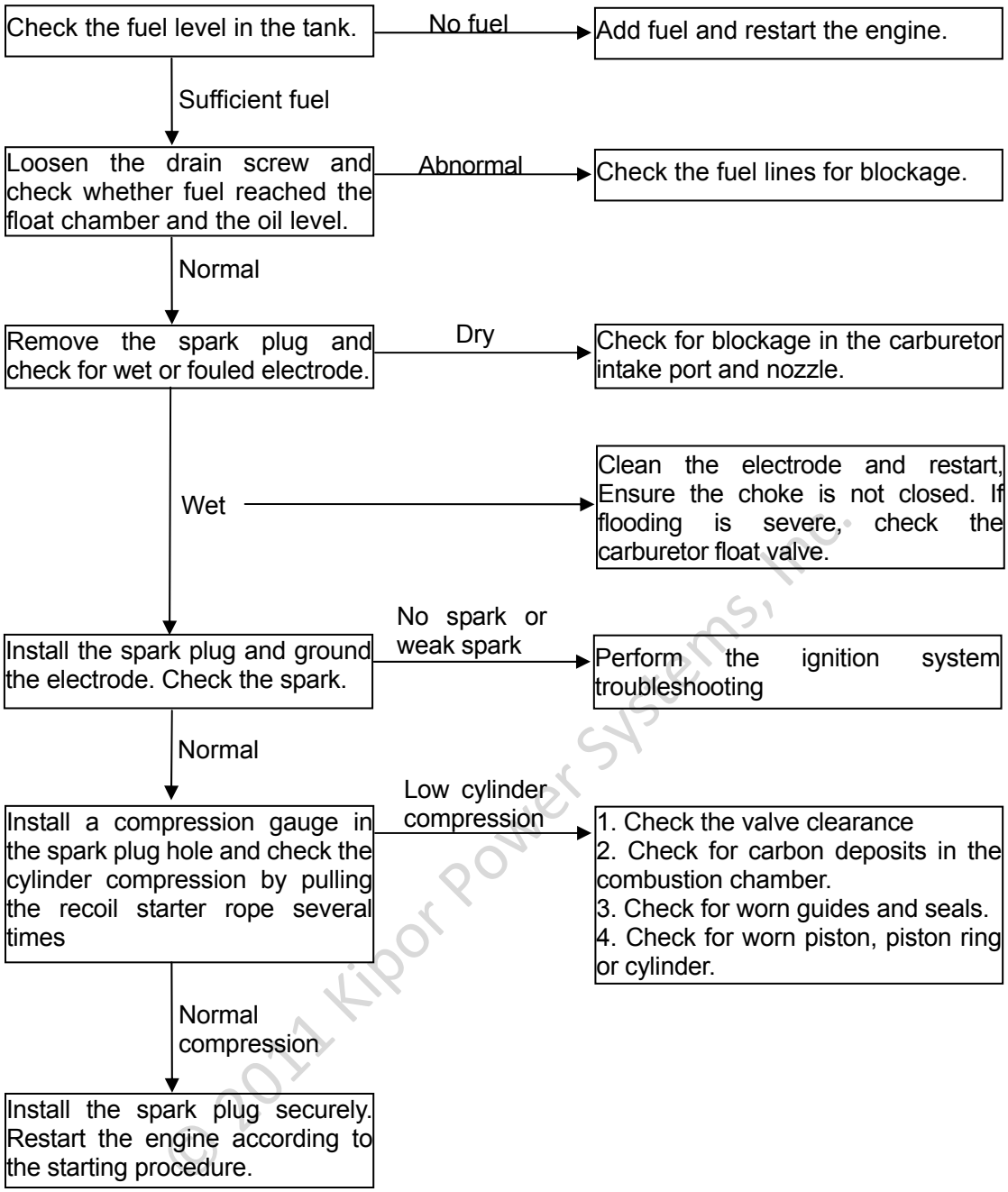
3.2 Hard starting


Check the fuel level in the tank.
No fuel
Add fuel and restart the engine.
Sufficient fuel
Loosen the drain screw and check whether fuel reached the float chamber and the oil level.
Abnormal
Check the fuel lines for blockage.
Normal
Remove the spark plug and check for wet or fouled electrode.
Dry
Check for blockage in the carburetor intake port and nozzle.
Wet
Clean the electrode and restart, Ensure the choke is not closed. If flooding is severe, check the carburetor float valve.
Install the spark plug and ground the electrode. Check the spark.
No spark or weak spark
Perform the ignition system troubleshooting
Normal
Install a compression gauge in the spark plug hole and check the cylinder compression by pulling the recoil starter rope several times
Low cylinder compression
1. Check the valve clearance
2. Check for carbon deposits in the combustion chamber.
3. Check for worn guides and seals.
4. Check for worn piston, piston ring or cylinder.
Normal compression
Install the spark plug securely. Restart the engine according to the starting procedure.

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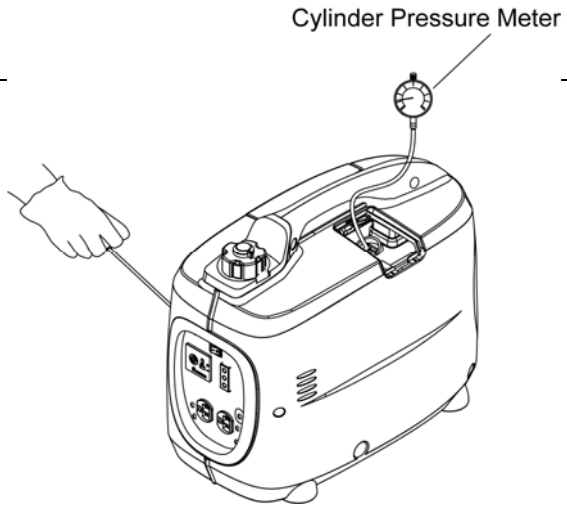
■ **Cylinder compression check**

1. Remove the spark plug cap and spark plug.

2. Install a compression gauge in the spark plug hole. Pull the recoil starter rope several times with force and measure the cylinder compression.

Cylinder compression	80 psi/0.55Mpa



C. Ignition system

■ Fill in oil to the required level.

■ Use spark plug UR5.

■ Spark plug inspection

1. Disassemble spark plug

2. Install spark plug onto spark plug cap.

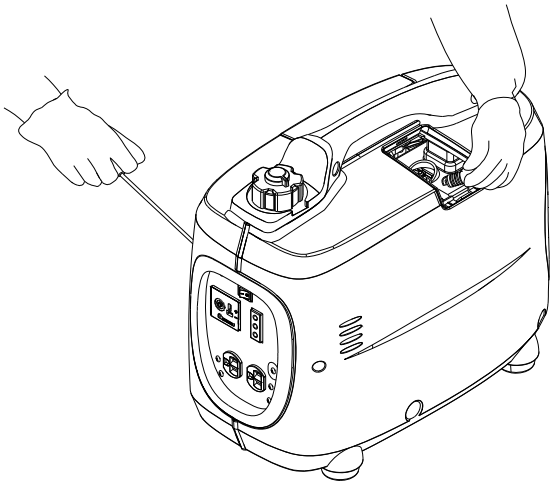
3. Set the oil switch to the “ON” position. Ground the negative (—) electrode (i.e. threaded part) of the spark plug against the shroud and pull the recoil starter rope to check the spark plug. Normally you should see the spark jump the electrode gap when the plug is firing.

Warning

■ Don’t pull the recoil starter while touching the high tension wire with wet hands. High voltage generates, which is very dangerous.

■ Fire may be caused if fuel spilled around the spark plug, so make sure that you test after draining off fuel completely.

■ Fuel inside cylinder will be burnt if the spark plug is near the hole, so please turn off the engine first. Pull the recoil starter several times to release the unborn gas in the cylinder.



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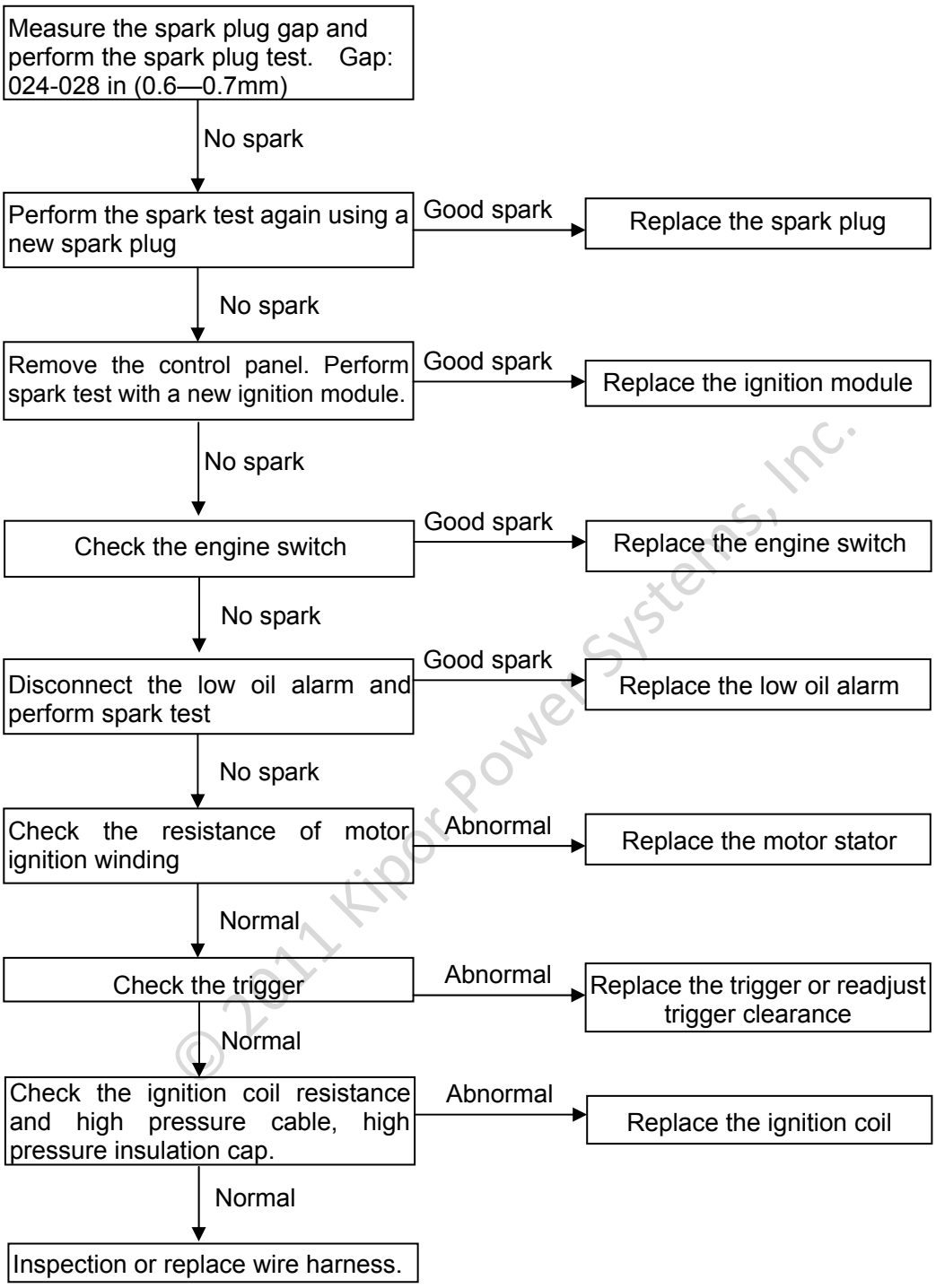
3.2 Hard Starting Continued


Measure the spark plug gap and perform the spark plug test. Gap: 024-028 in (0.6—0.7mm)
No spark
Perform the spark test again using a new spark plug
Good spark
Replace the spark plug
No spark
Remove the control panel. Perform spark test with a new ignition module.
Good spark
Replace the ignition module
No spark
Check the engine switch
Good spark
Replace the engine switch
No spark
Disconnect the low oil alarm and perform spark test
Good spark
Replace the low oil alarm
No spark
Check the resistance of motor ignition winding
Abnormal
Replace the motor stator
Normal
Check the trigger
Abnormal
Replace the trigger or readjust trigger clearance
Normal
Check the ignition coil resistance and high pressure cable, high pressure insulation cap.
Abnormal
Replace the ignition coil
Normal
Inspection or replace wire harness.

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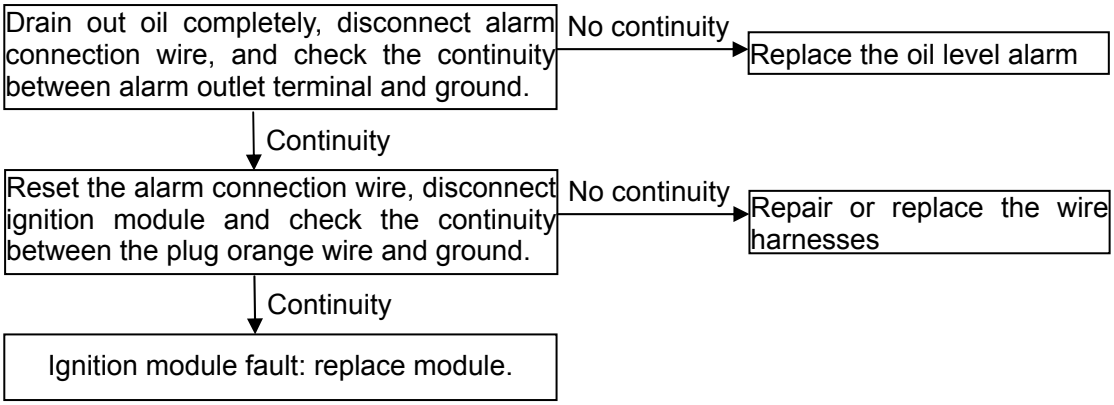
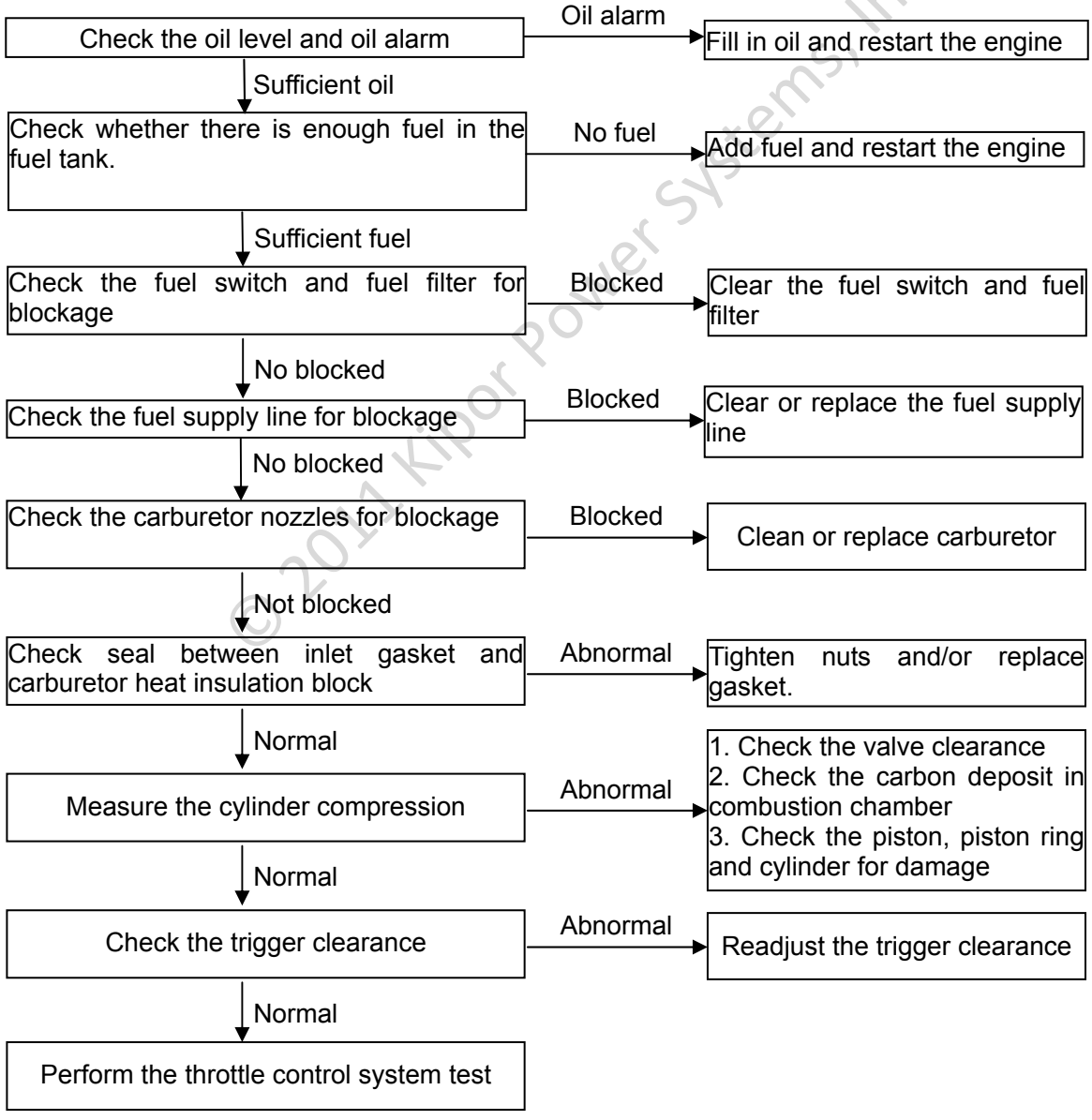
3.3 Engine oil level is low, but engine does not stop. (Defective oil switch)


Drain out oil completely, disconnect alarm connection wire, and check the continuity between alarm outlet terminal and ground.
No continuity
Replace the oil level alarm
Continuity
Reset the alarm connection wire, disconnect ignition module and check the continuity between the plug orange wire and ground.
No continuity
Repair or replace the wire harnesses
Continuity
Ignition module fault: replace module.

3.4 Engine stops running (Throttle is at the correct position)


Check the oil level and oil alarm
Oil alarm
Fill in oil and restart the engine
Sufficient oil
Check whether there is enough fuel in the fuel tank.
No fuel
Add fuel and restart the engine
Sufficient fuel
Check the fuel switch and fuel filter for blockage
Blocked
Clear the fuel switch and fuel filter
No blocked
Check the fuel supply line for blockage
Blocked
Clear or replace the fuel supply line
No blocked
Check the carburetor nozzles for blockage
Blocked
Clean or replace carburetor
Not blocked
Check seal between inlet gasket and carburetor heat insulation block
Abnormal
Tighten nuts and/or replace gasket.
Normal
Measure the cylinder compression
Abnormal
1. Check the valve clearance
2. Check the carbon deposit in combustion chamber
3. Check the piston, piston ring and cylinder for damage
Normal
Check the trigger clearance
Abnormal
Readjust the trigger clearance
Normal
Perform the throttle control system test

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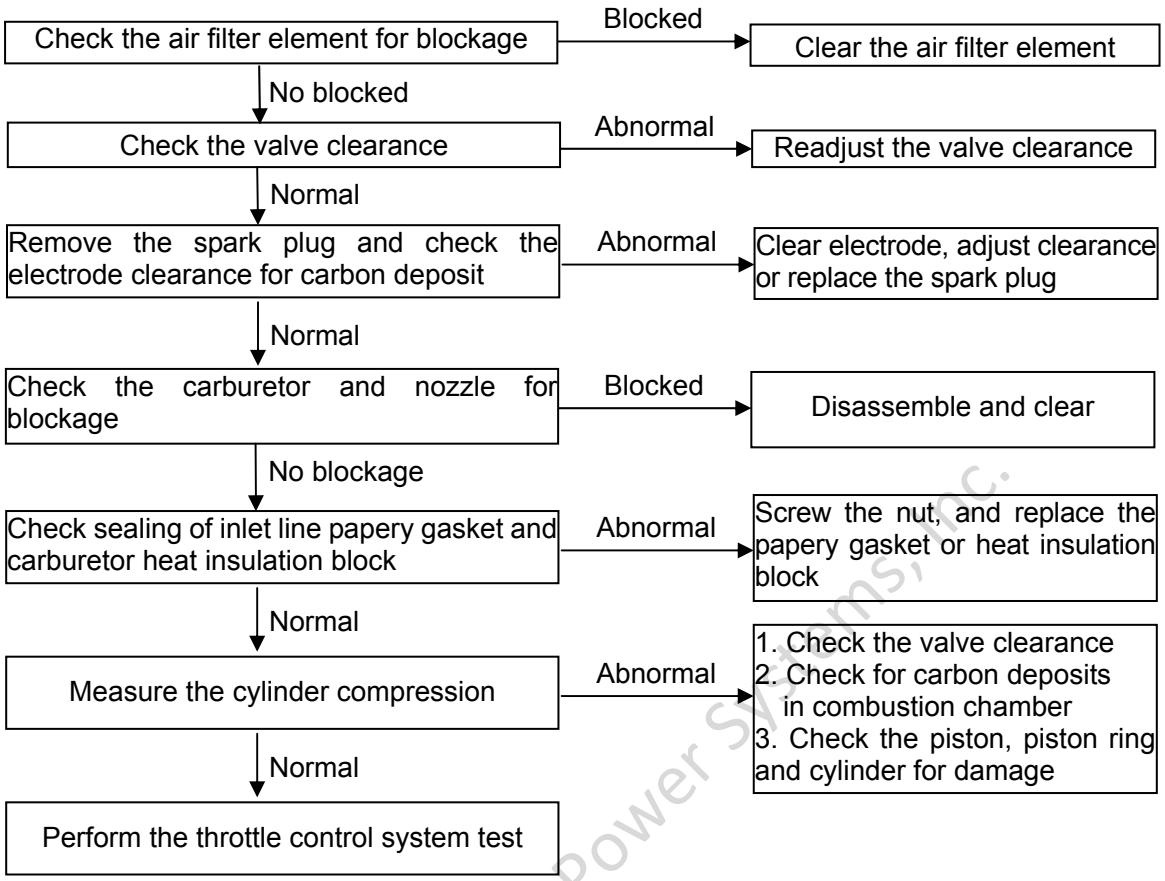
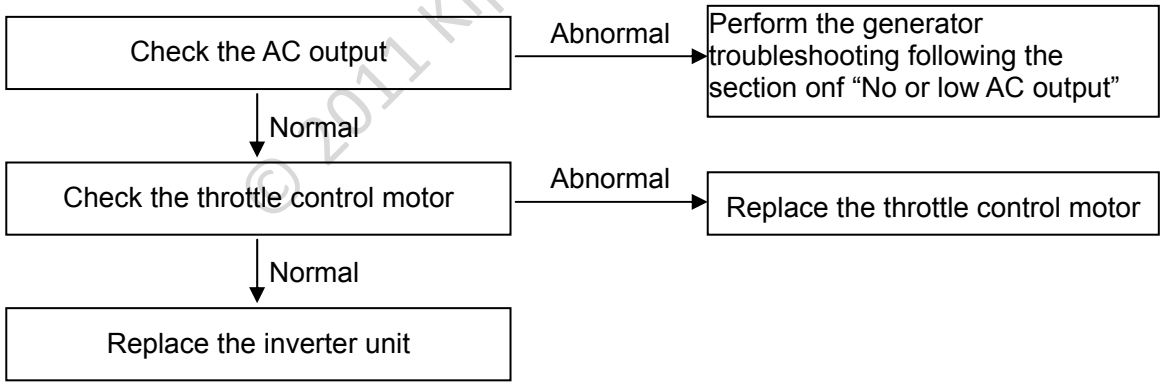
3.5 Engine speed can't increase or unstable (choke is at the correct position)


Check the air filter element for blockage
Blocked
Clear the air filter element
No blocked
Check the valve clearance
Abnormal
Readjust the valve clearance
Normal
Remove the spark plug and check the electrode clearance for carbon deposit
Abnormal
Clear electrode, adjust clearance or replace the spark plug
Normal
Check the carburetor and nozzle for blockage
Blocked
Disassemble and clear
No blockage
Check sealing of inlet line papery gasket and carburetor heat insulation block
Abnormal
Screw the nut, and replace the papery gasket or heat insulation block
Normal
Measure the cylinder compression
Abnormal
1. Check the valve clearance
2. Check for carbon deposits in combustion chamber
3. Check the piston, piston ring and cylinder for damage
Normal
Perform the throttle control system test

3.6 Engine speed too high or too low



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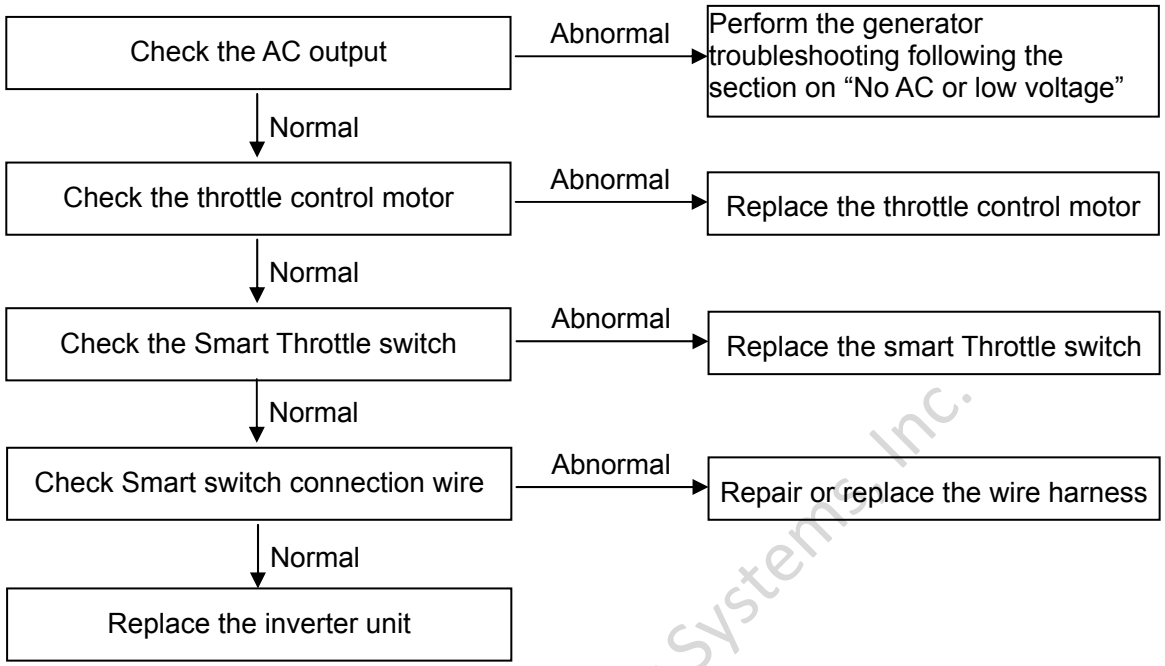
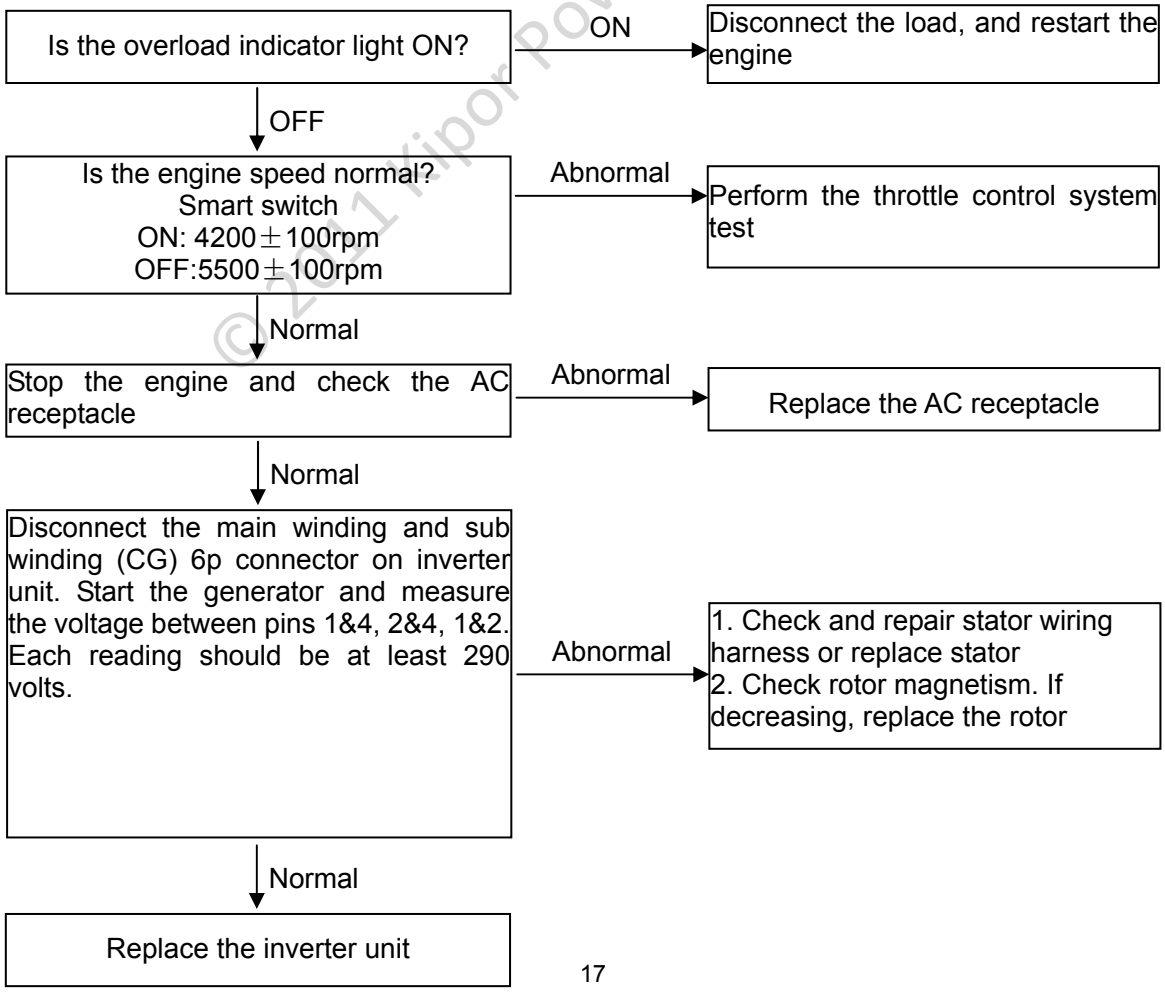
3.7 Smart system doesn't work with zero load or engine speed doesn't increase with Smart system on and load connected.



3.8 No or low AC output


Is the overload indicator light ON?
ON
Disconnect the load, and restart the engine
OFF
Is the engine speed normal?
Smart switch
ON: 4200±100rpm
OFF:5500±100rpm
Abnormal
Perform the throttle control system test
Normal
Stop the engine and check the AC receptacle
Abnormal
Replace the AC receptacle
Normal
Disconnect the main winding and sub winding (CG) 6p connector on inverter unit. Start the generator and measure the voltage between pins 1&4, 2&4, 1&2. Each reading should be at least 290 volts.
Abnormal
1. Check and repair stator wiring harness or replace stator
2. Check rotor magnetism. If decreasing, replace the rotor
Normal
Replace the inverter unit

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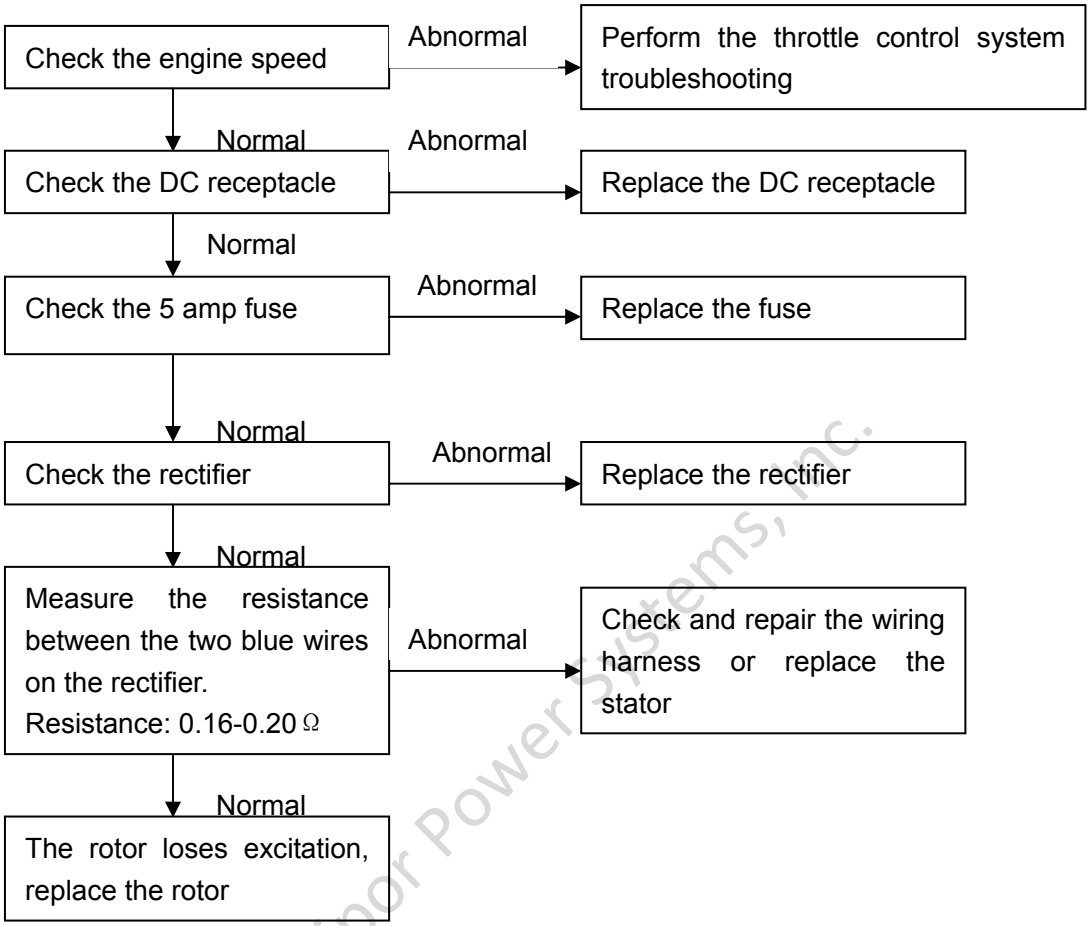
3.9 No DC output



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4. Maintenance

4.1 Maintenance schedule

Regular service period Item perform at every indicated month or operating hour interval, whichever comes first		Each use	First month or 20 Hrs.	Every 3 months or 50Hrs.	Every 6 months or 100 Hrs.	Every year or 300 Hrs.
Engine Oil	Check	●				
	Replace		●		●	
Air filter	Check	●				
	Clean			●*		
Spark plug	Clean-Adjust				●	
Spark catcher	Clean-Adjust				●	
Valve clearance	Check-Adjust					●**
Fuel tank and filter	Clean					●**
Fuel line	Check	Every 2 year (Replace if necessary)				

Note:

* Service more frequently when operating in dusty areas.

** Service by KIPOR authorized service center.

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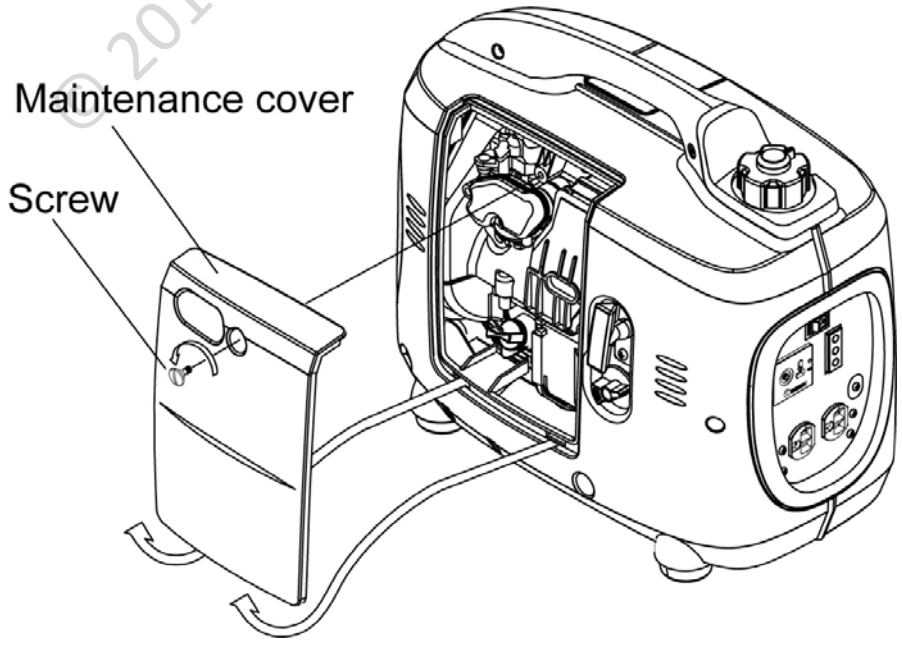
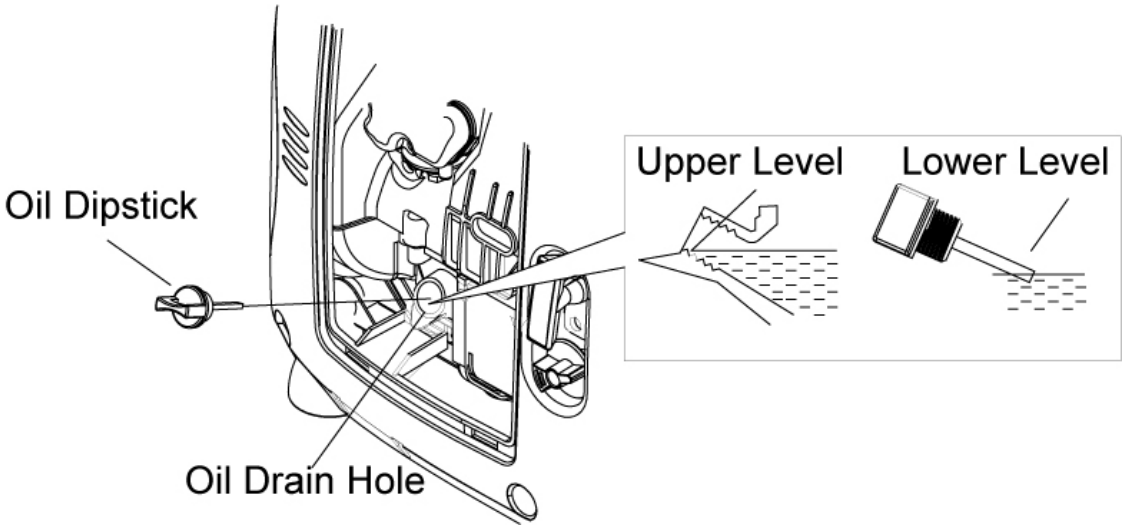
4.2 Engine oil

■ **Checking for the oil level**

Stop the engine and check the oil level, be sure to put the engine on a flat and level surface when checking.

1. Loosen the maintenance cover screw and remove the cover.
2. Remove the oil filler cap and check the oil level.





3. If the oil level is low, add to the edge of the oil filler port.

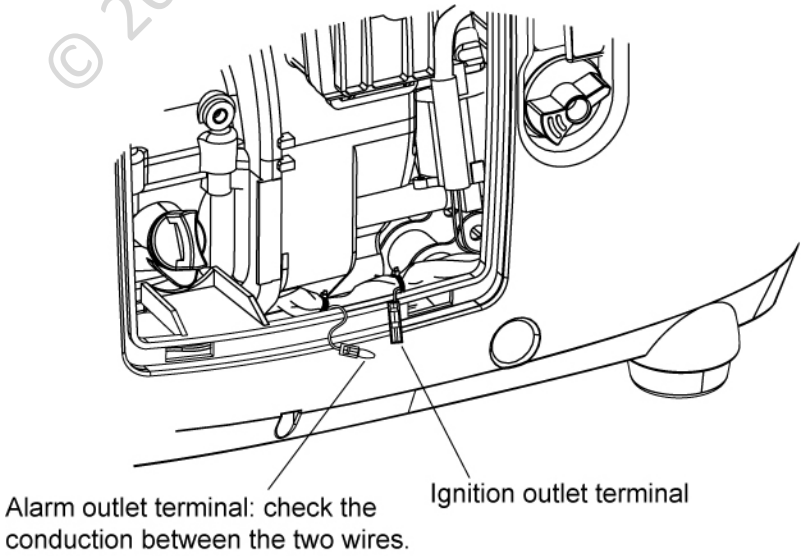
■ **Replace the engine oil**

1. Remove the oil dipstick and oil drain bolt, drain out dirty oil.
2. Reinstall the oil drain bolt tightly.
3. Fill with fresh oil of the proper viscosity (see operator's manual).
4. Check the oil level.
5. Tighten the oil dipstick.

■ Drain the used oil while the engine is warm. Warm oil drains quickly and completely. Avoid burns from hot oil.

4.3 Checking the low oil alarm

1. Disconnect oil alarm connector when the engine is still running, connect the two plugs, be sure that oil alarm lights and engine stops.



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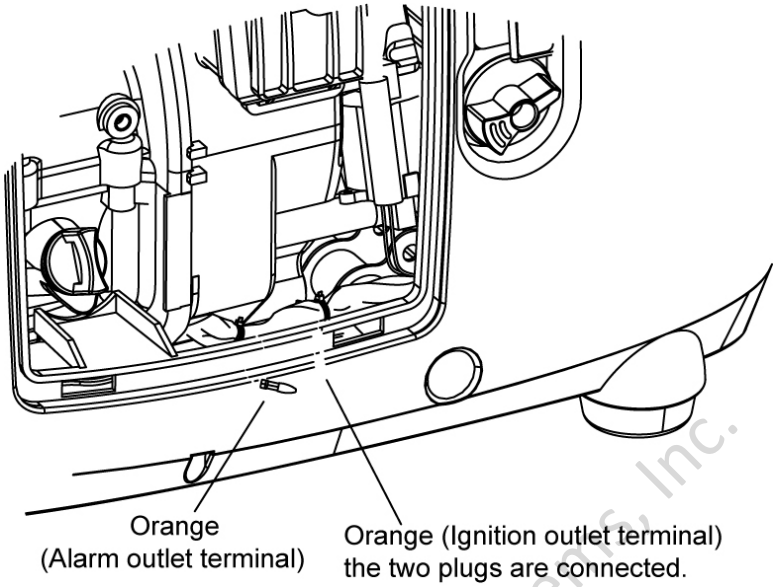
2. Stop engine, disconnect oil alarm connector, check the connector conduction, no conduct is normal.



3. Drain out the oil inside engine and check the conduction, conduct is normal.

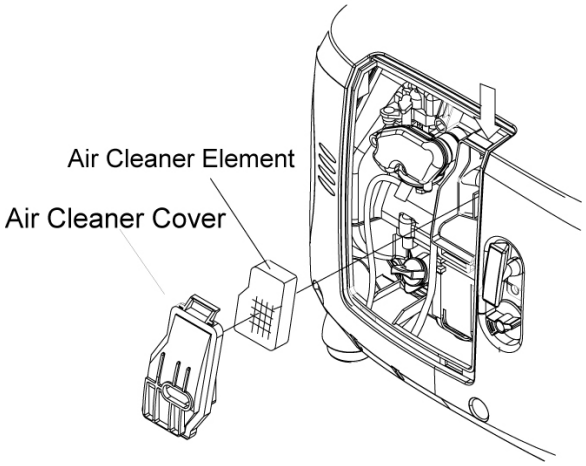
4.4 Air cleaner

Inspection/Cleaning:

1) Loosen the cover screw and remove the maintenance cover.
2) Disengage the locking tab by pushing it, and remove the air cleaner cover.
3) Remove the element from the air cleaner case.
4) Clean the element in warm soapy water, rinse and allow to dry thoroughly and allow to dry.
5) Dip the element in clean engine oil and squeeze out all the excess oil.
6) Install the air cleaner element in the air cleaner case.

Clean the air cleaner rubber and the air cleaner case if necessary. Be sure that the air cleaner cover seals are set securely.

7) Install the air cleaner cover. Be sure that the air cleaner cover seals are set securely.
8 Install the maintenance cover securely.



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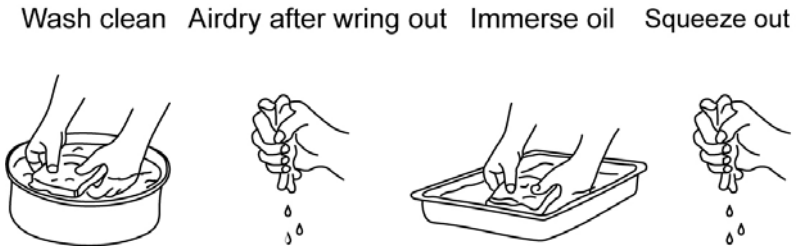

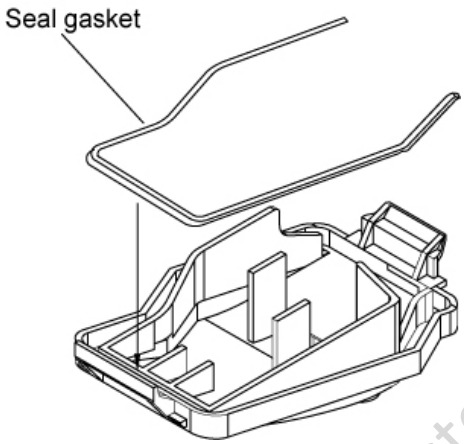

Caution

■ A dirty air cleaner will restrict air flow to the carburetor, reducing engine performance. If the engine is operated in dusty areas, clean the air cleaner more often than specified in the Maintenance Schedule.

■ Never run the engine with no element or a damaged element. Engine damage will result.

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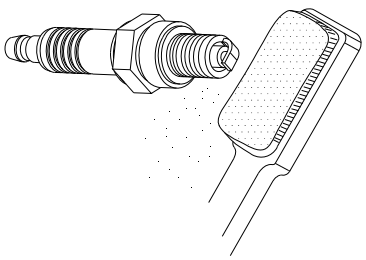
4.5 Spark plug

Inspection/Cleaning:

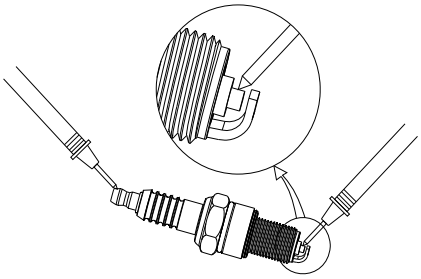
1) Remove the spark plug cap and remove the spark plug.

2) Remove carbon or other deposits with a plug cleaner or stiff ire brush. Check the sealing washer for damage.



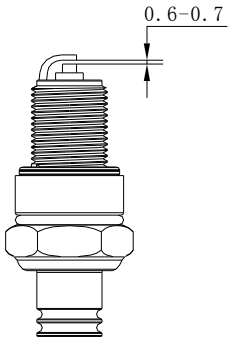
3) Measure the plug resistance; replace the spark plug if the measure is not accord with the asked valve.

Spark plug resistance	3~9KΩ



4) Measure the plug gap with a wire-type feeler gauge. Adjust by bending the side electrode if the measure is not accord with the asked valve.

Spark plug clearance	.024-.028 in. (0.6~0.7mm)
Standard spark plug	UR5



5). Install the plug finger tight to seat the washer, and then tighten with a plug wrench.
Torque valve is 8.-~9.6 ft lbs, 11~13 N.m

4.6 Valve clearance

Caution

■ Valve clearance inspection and adjustment must be performed with the engine cold.

Inspection/Adjustment:

1) Remove the following parts:
—Front cover, control panel
—Rear cover
—Right/left side covers
—Fuel tank
—Inverter unit, engine bed
—Recoil starter, fan cover
—Inlet/Exhaust side baffle

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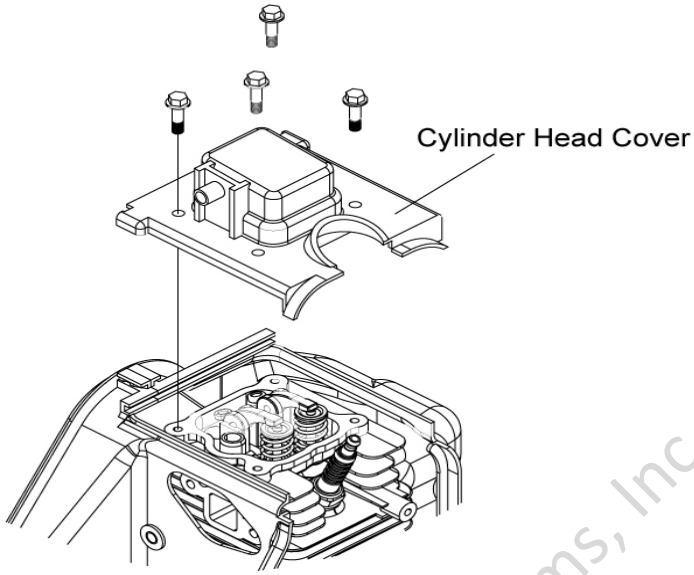
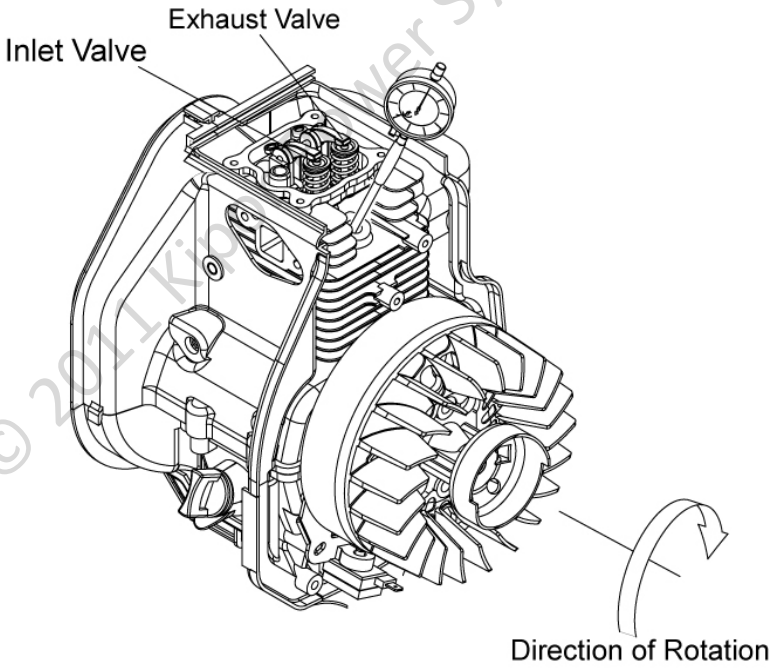
2) Remove the four tighten bolts and disassemble the cylinder cover. Don't remove the cylinder cover with excessive force as it may deform. Replace the cylinder cover if it is deformed.



3) Remove the spark plug; screw the dial indicator in the spark plug hole. Rotate the rotor in a clockwise movement and set the piston at top dead center.



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Caution

■ Make sure both the intake and exhaust valves are closed.

4) Insert a feeler gauge between the rocker arm and the valve and measure the valve clearance.

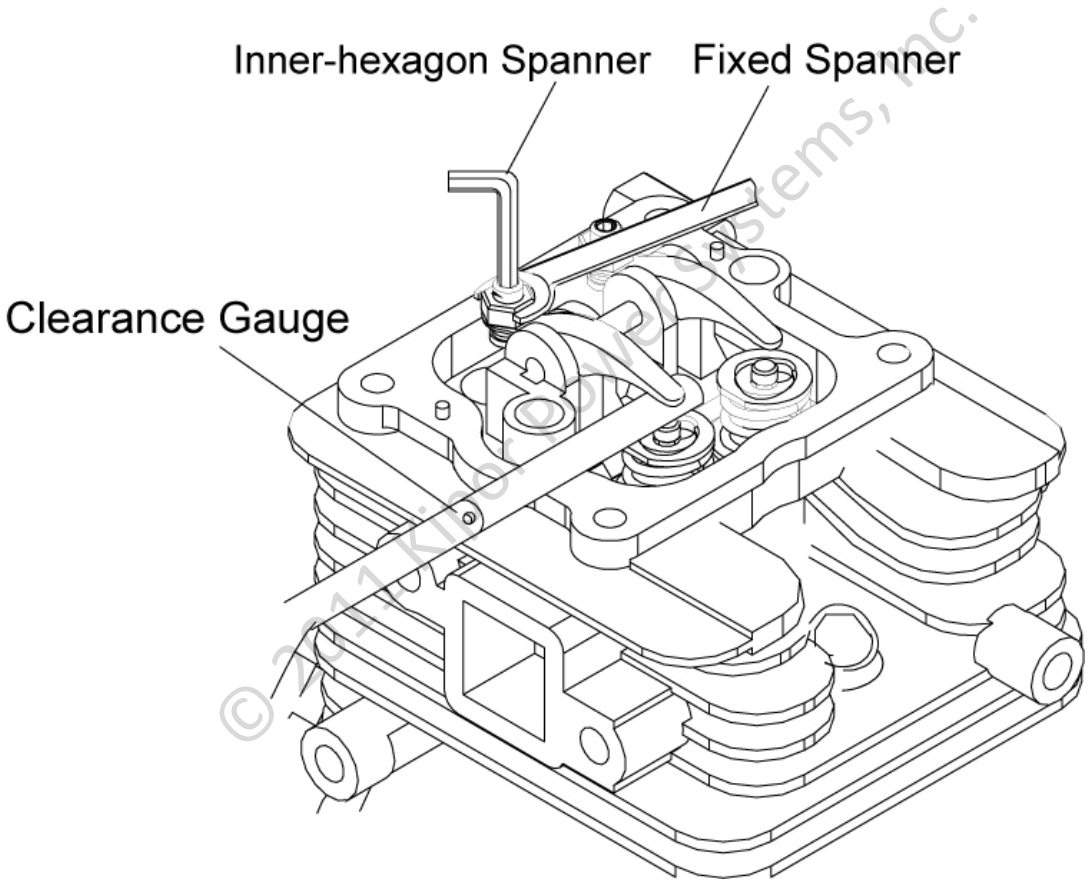
Valve clearance	Intake	.0031-.0039 in (0.08-0.10mm)
	Exhaust	.0039-.0059 in (0.10-0.15) mm

5) If adjustment is necessary, proceed as follows.

a. Loosen the adjusting screw lock nut and adjust the valve clearance by turning the adjusting screw in or out.

b. Secure the adjusting screw with a socket wrench and tighten the lock nut to the specified torque.

c. After tightening the lock nut, check the valve clearance again.



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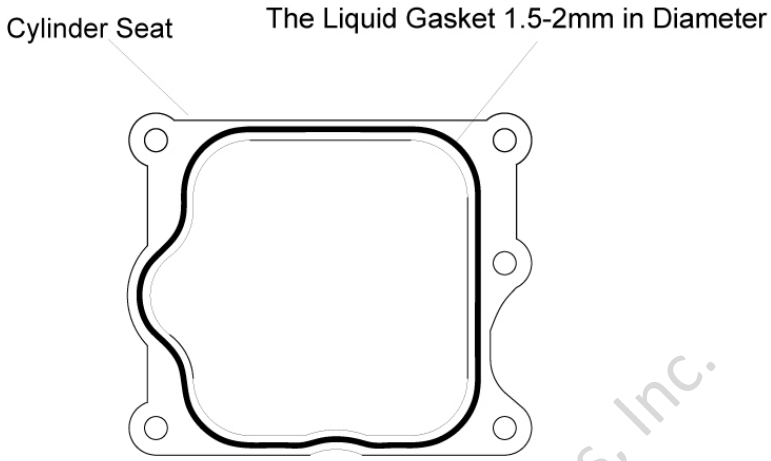
6) Clean the liquid gasket of the cylinder block and cylinder head cover. Apply liquid gasket (Three Bond 1207B or equivalent) to the cylinder block installation surface as shown.



7) Install all parts in the reverse order of removal.

4.7 Fuel tank/Fuel filter

Caution

■ Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel. Keep heat, sparks, and flame away. Wipe up spills immediately.

Cleaning:

1) Drain the fuel from the tank and carburetor, and then remove the following parts.
—Rear cover
—Front cover and control panel
—Right/Left side cover
2) Disconnect the fuel tube from the fuel tank, and remove the fuel filter.
3) Remove the clogged foreign material from the fuel filter, and check the fuel filter for damage. Replace the fuel filter if necessary.
4) Remove the fuel tank and clean it with cleaning solvent and allow the fuel tank to dry thoroughly.
5) After cleaning, install the fuel tank and set the fuel filter in the tank. Connect the fuel tube.
6) Install the removed parts in the reverse order of removal.
7) Fill the fuel tank with gasoline and check the fuel tube for gasoline leakage.

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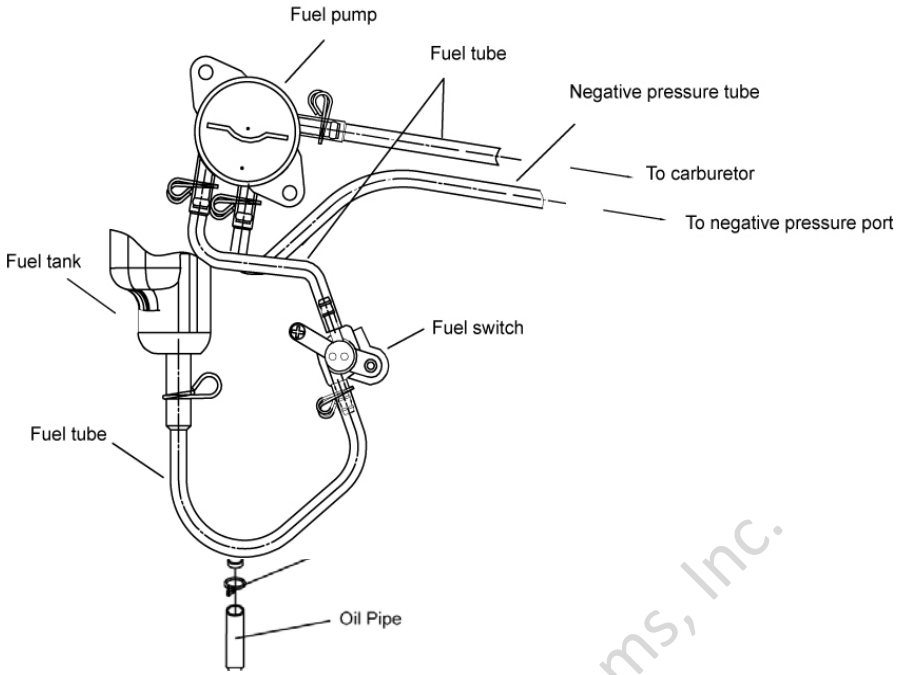

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4.8 Fuel pump and hoses

Caution

■ Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel. Keep heat, sparks, and flame away. Wipe up spills immediately.

1) Drain the fuel from the tank and carburetor, and then remove the following parts.

—Rear cover

—Front cover and control panel

—Right/Left side cover

2) Make sure the negative pressure tube is firmly connected to the port on the engine block. See page 37.

3) Check the fuel tube for deterioration, cracks and gasoline leakage. If there is any abnormality in the fuel tube, replace the tube.

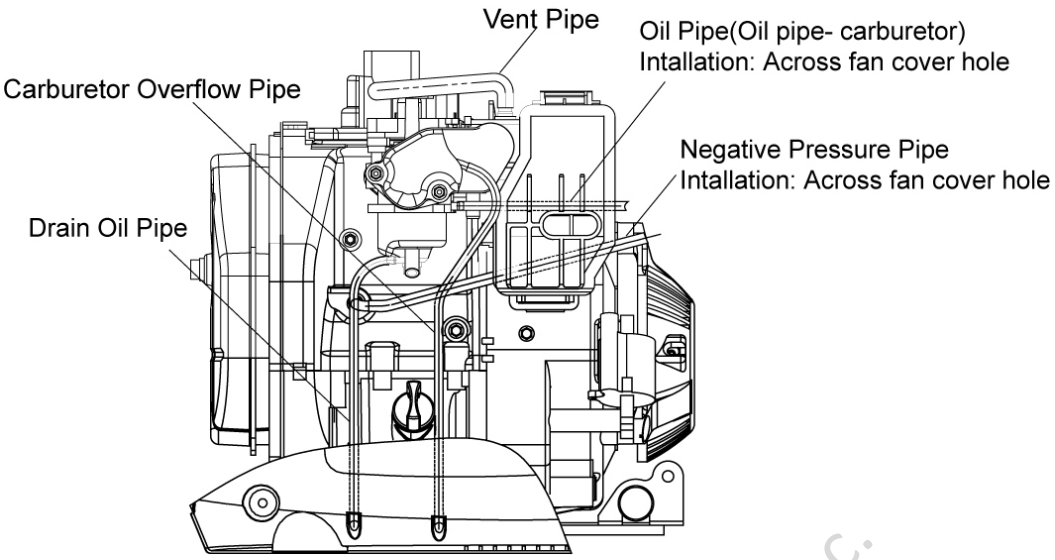
4) Check the diaphragm tube for deterioration, crack and oil leakage. If there is any abnormality in the diaphragm tube, replace the tube.

5) Check to see whether water or foreign material has been accumulated in the fuel pump.

If there is water or foreign material accumulated in the pump, replace the fuel pump.

6) Check the fuel switch and fuel duct, blow away the foreign matter with high pressure gas with oil switch turned on.

7) After assembly, check for gasoline leakage from each part.



4.9 Spark arrestor

Caution

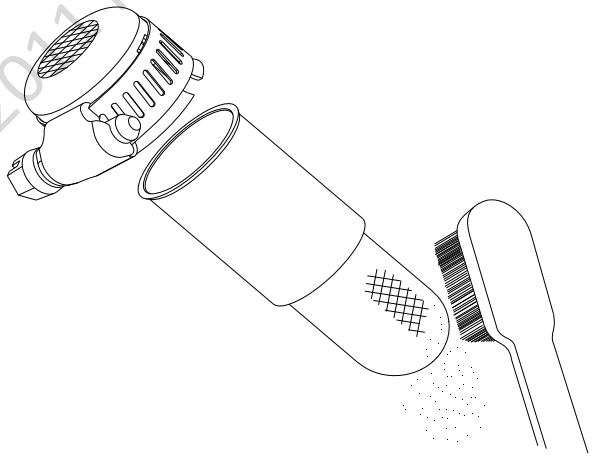
■ Make sure the muffler has cooled completely before attempting any maintenance on this part.

(1) Remove the rear cover

(2) Disassemble the arrestor from muffler

(3) Remove the carbon from the spark arrestor steel mesh with a stiff wire brush. Check for damage and replace it if necessary.

(4) Install the removed parts in the reverse order of removal.



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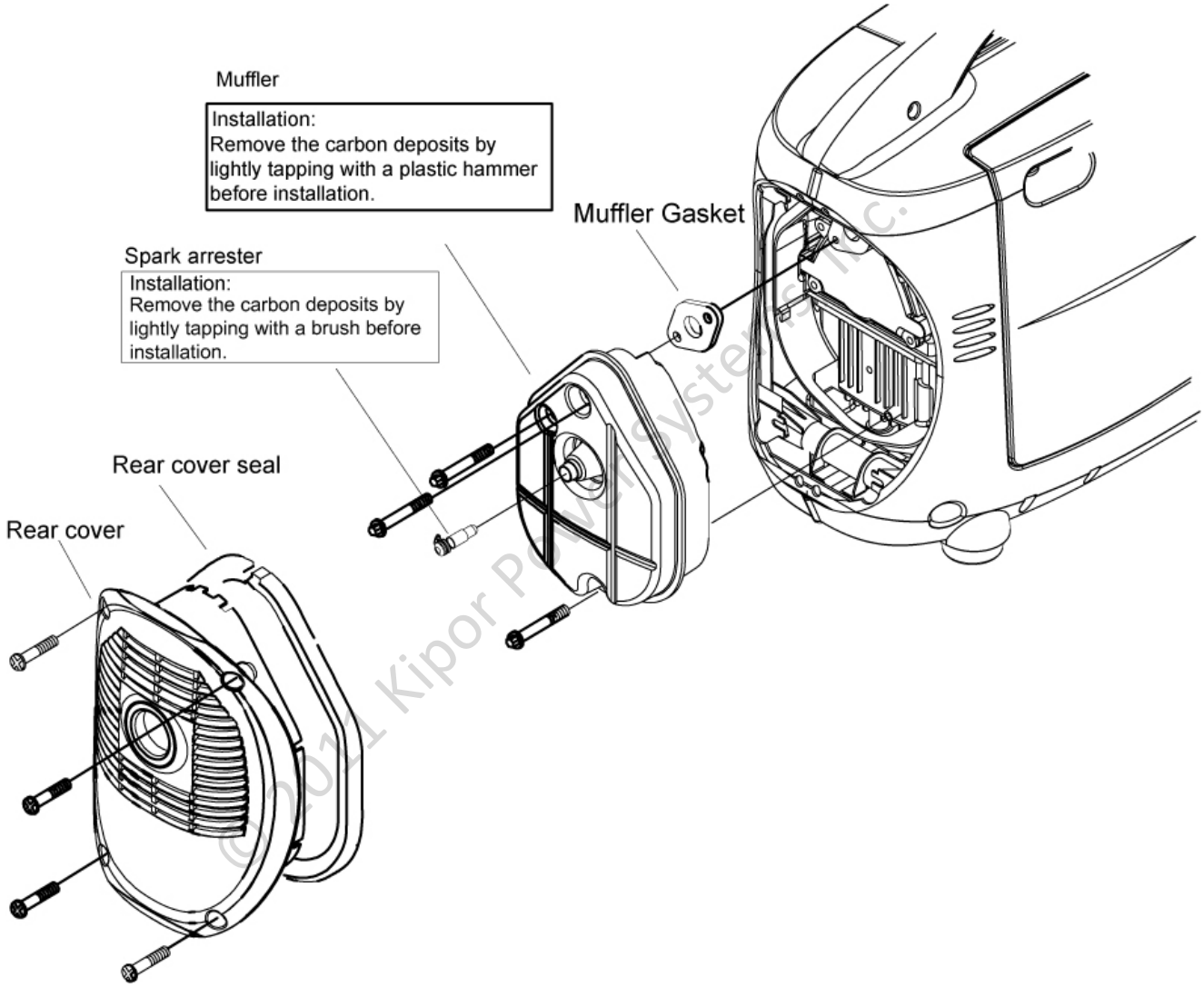
5. Muffler

Caution

■ Muffler removal/installation must be performed with the engine cold.

● **Disassembly/Reassembly**


Muffler
Installation:
Remove the carbon deposits by lightly tapping with a plastic hammer before installation.
Muffler Gasket
Spark arrester
Installation:
Remove the carbon deposits by lightly tapping with a brush before installation.
Rear cover seal
Rear cover

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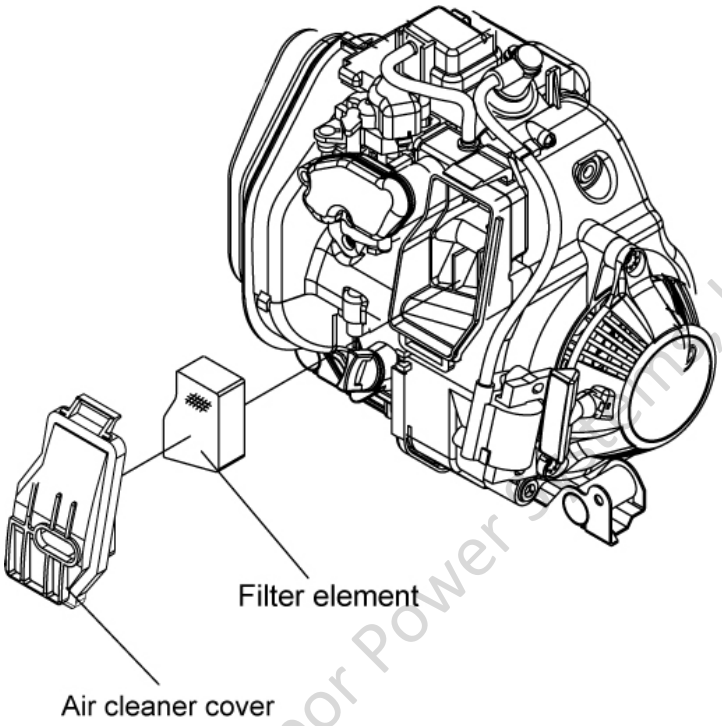
6. Air filter/Carburetor

Caution

- Loosen the drain oil bolt and drain out fuel before disassembly.
- Keep heat, flame and sparks away.

6.1 Air filter removal and installation



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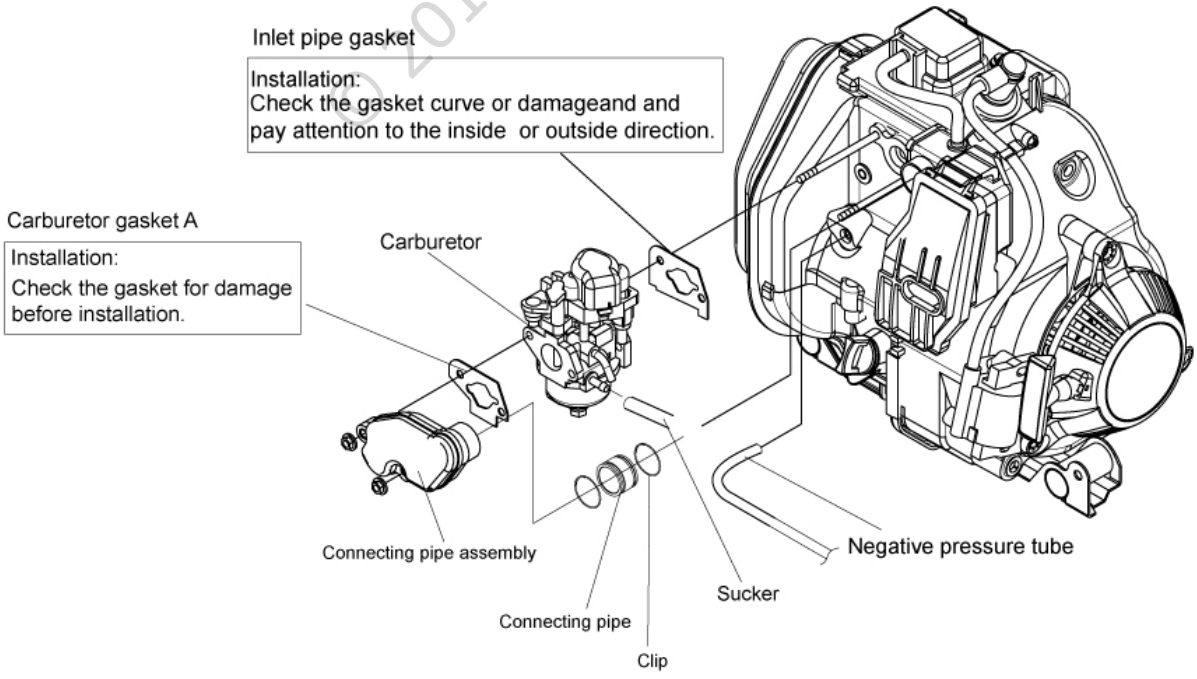
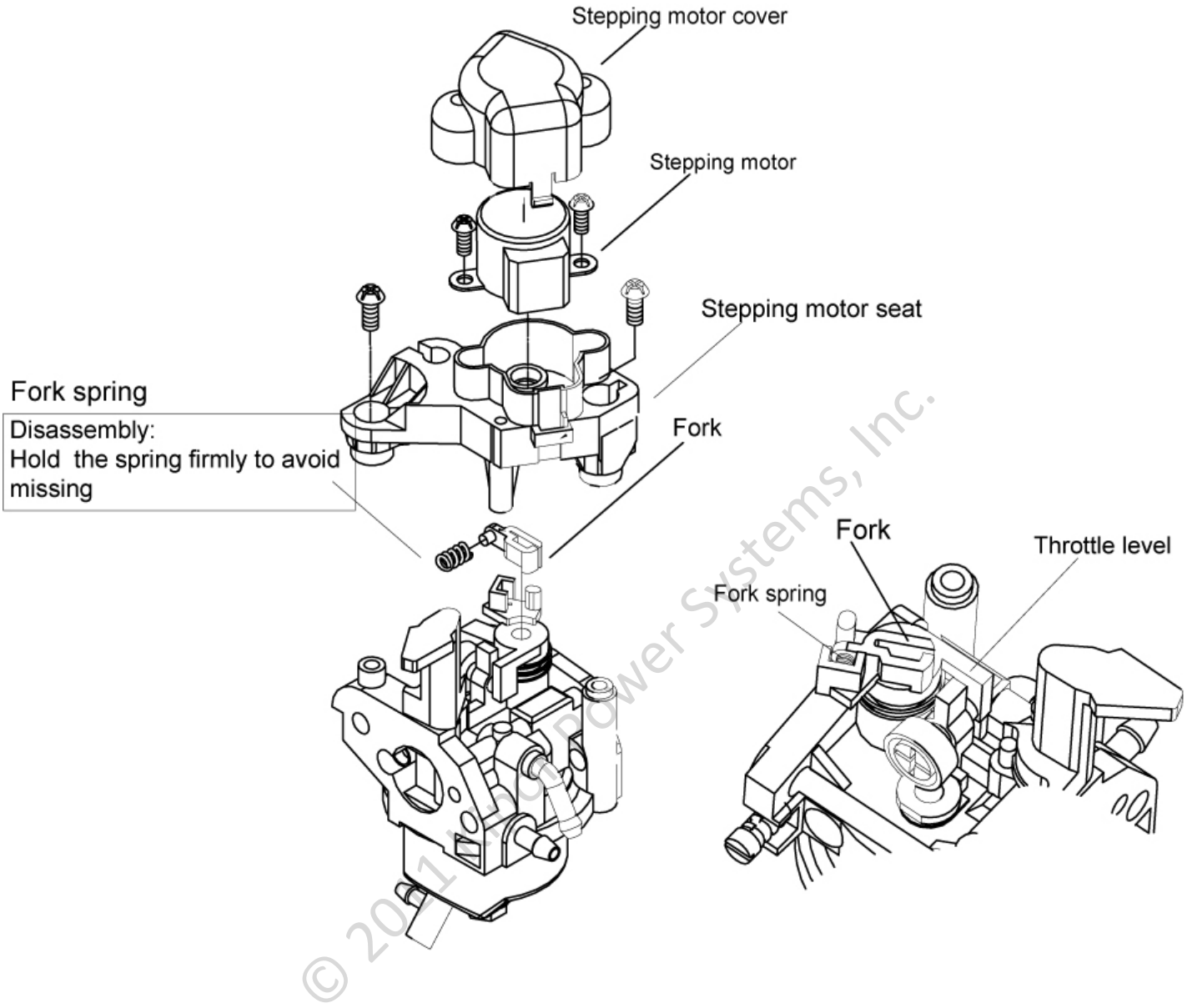
6.2 Carburetor removal and installation



6.3 Stepping motor removal and installtion



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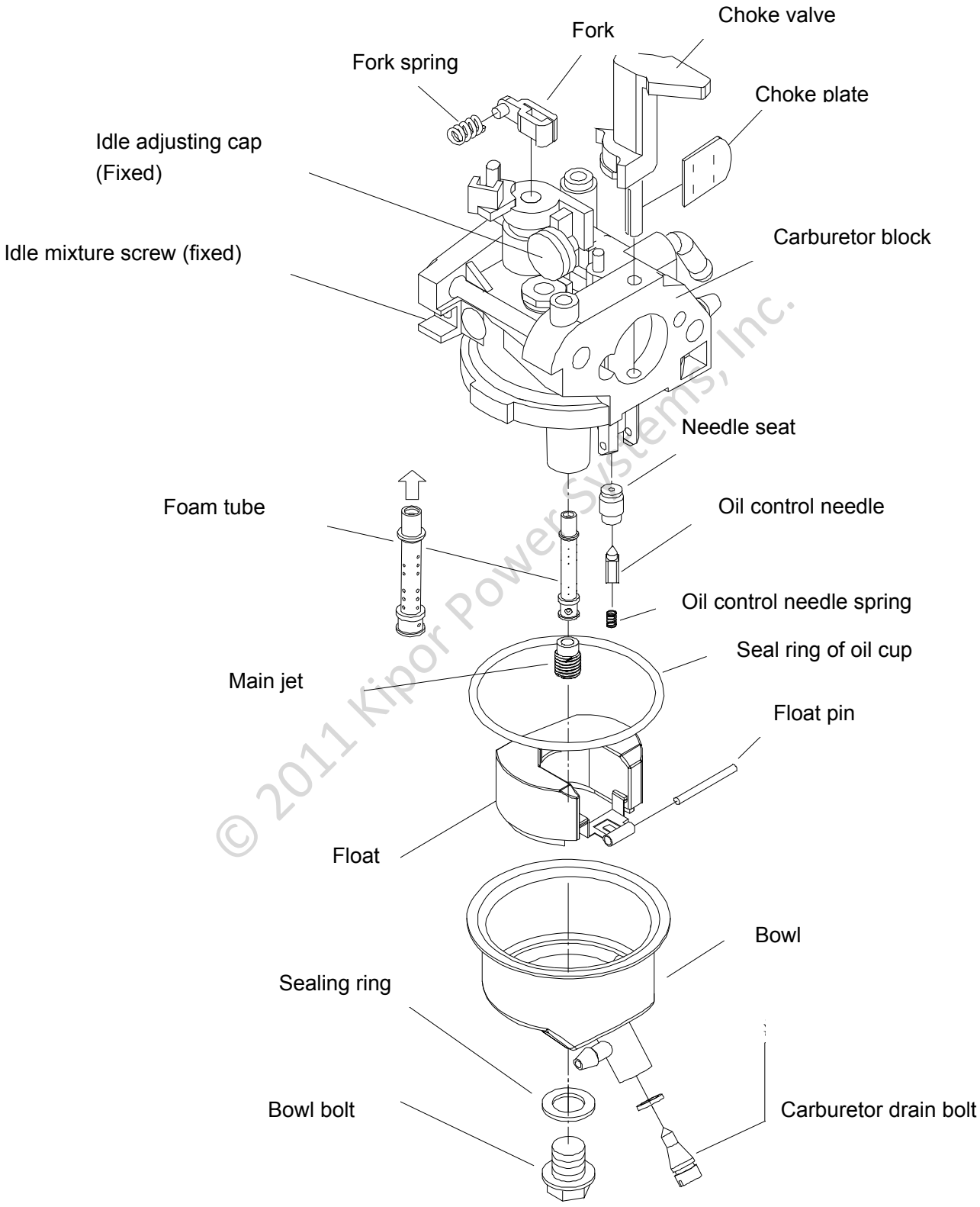
6.4 Carburetor exploded drawing

Note: With the exception of changing the main jet for altitude compensation, no adjustments to this carburetor are permitted under EPA and CARB guidelines. No repair parts will be furnished.



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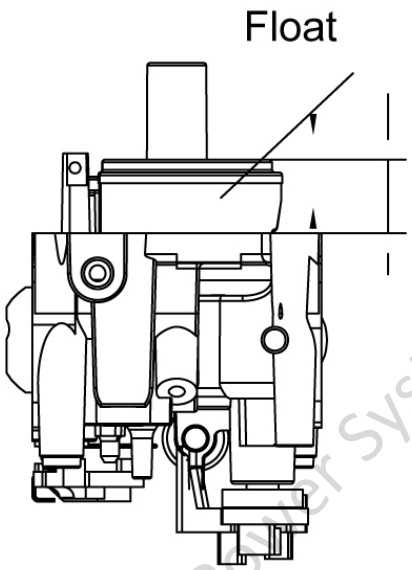
6.5 Inspection

● Float height

Place the carburetor as the picture shows, measure the float height between float and carburetor block.

Height	0.0047 in (12mm)

Replace the carburetor if the float height is not the right size.



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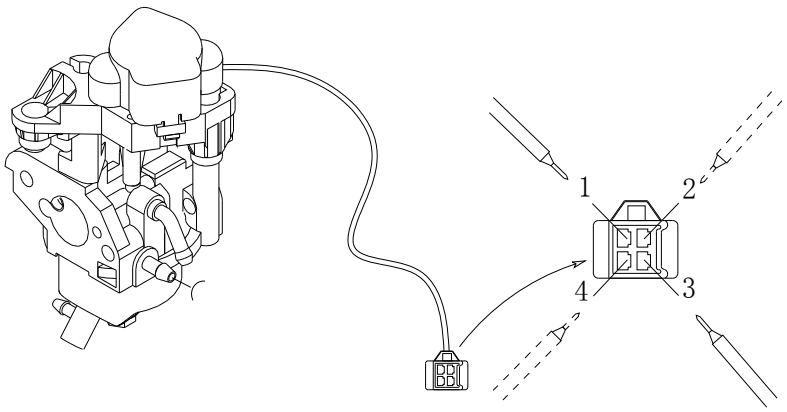
● Stepping motor

Measure the resistance of stepping motor lead-out wire.

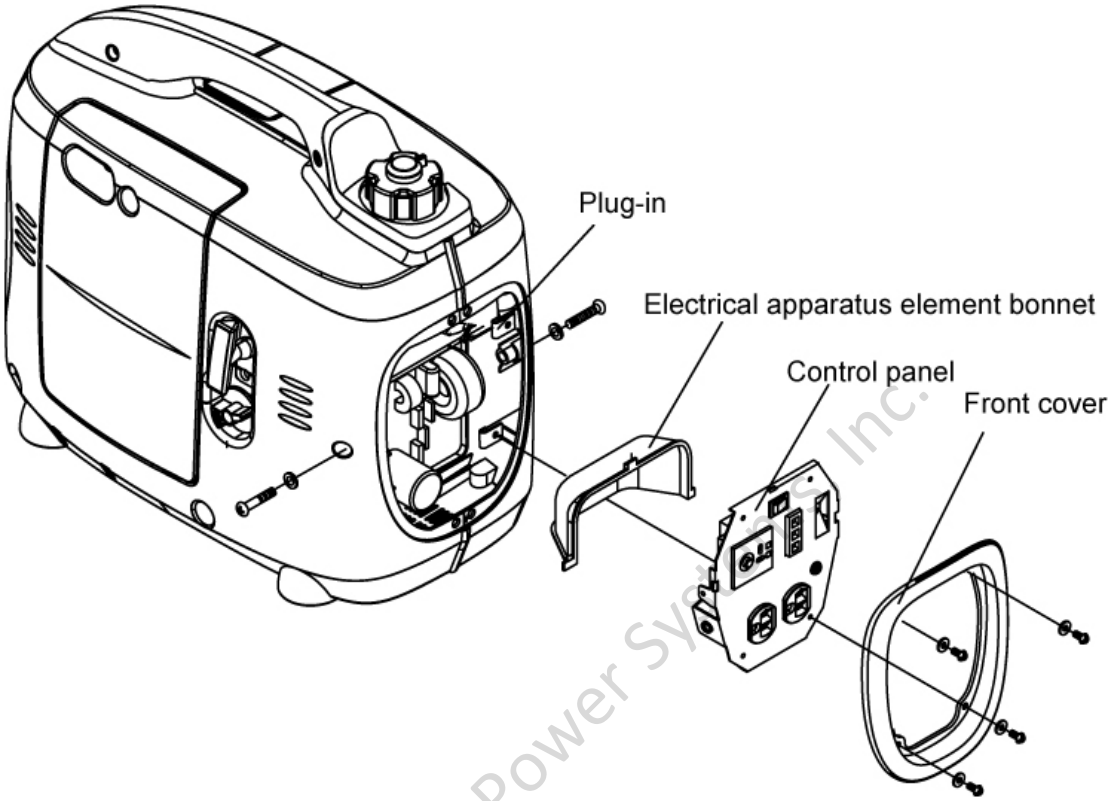
Standard resistance	Between 1and 3：45~55Ω
	Between 2 and 4：45~55Ω

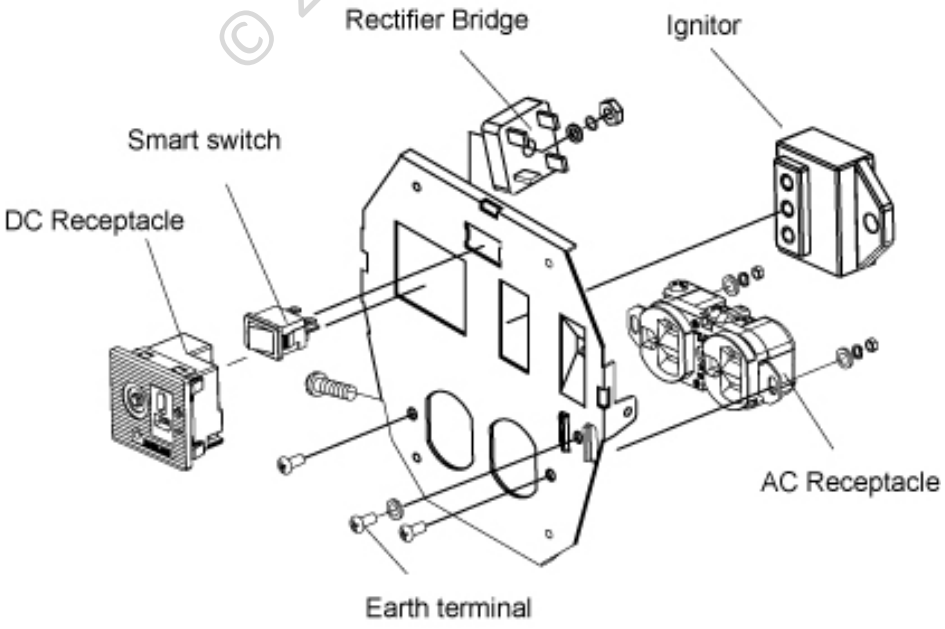
Replace the stepping motor if the resistance excesses the above range.



7. Control panel

7.1 Removal/Installation





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7.2 Inspection

a. Control panel

● **AC receptacle**

Check the electrode contact disk inside receptacle; if it is burnt or discolored, replace for it.

● **DC receptacle**

After checking the fuse, connect both terminals of the receptacle with a jumper wire to short. There must be continuity between the lead wire terminals with the circuit protector ON. Replace the DC receptacle if there is no continuity.

● **Smart switch**

There should be continuity with the switch ON, and no continuity with the switch OFF.

● **Ignition Module**

Pull off the 10P receptacle from the module, measure the resistance by connecting one testing pen with the metal outer case of engine, and the other testing pen with the 10P connector.

Color	Circuit unit	Standard resistance
Blue	Primary coil of the ignition coil	0.8-1.3Ω
Orange	Oil level alarm	There should be no continuity with correct oil level
Yellow	Trigger coil	80-130Ω
Yellow/Green	Ground wire	Continuity
Green	Igniter unit power coil winding	0.5-0.7Ω
Red	Engine switch	There should be no continuity with the switch ON, continuity with the switch OFF

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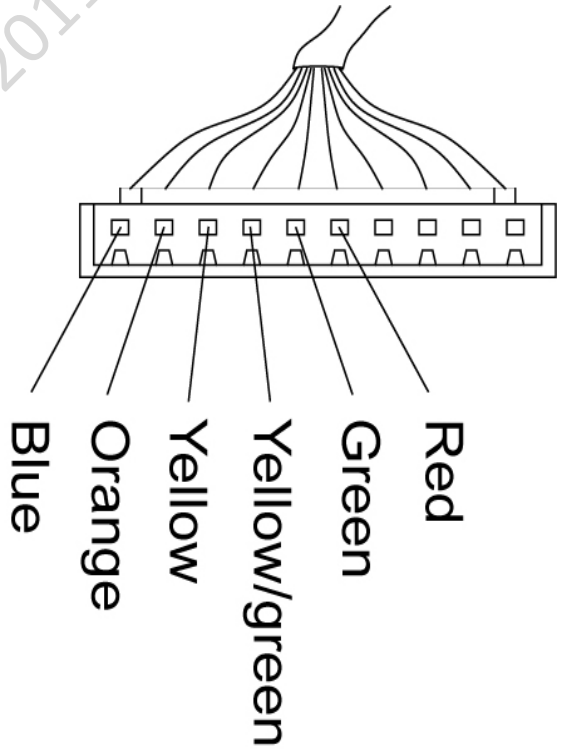
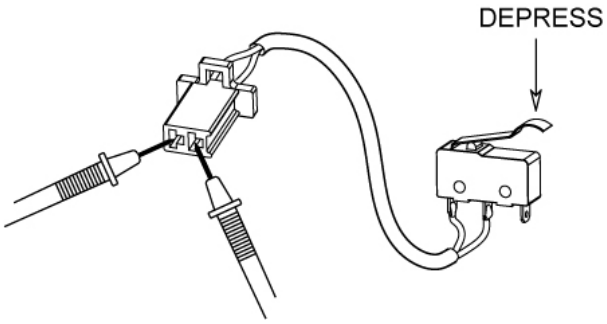


● **Engine switch**



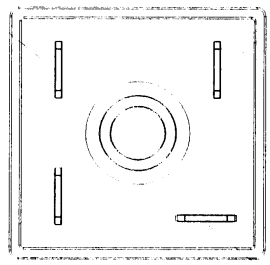
Check the continuity of connector, there should be continuity when the micro switch is depressed.

● **Rectifier**

Measure the on or off (positive pressure fall) of rectifier with control potentiometer, the measurement should accord with the standard as shown in the chart.

Positive / Negative	1	2	3	4
1		OFF	OFF	OFF
2	ON		OFF	OFF
3	ON	ON		ON
4	ON	OFF	OFF	

（1） Negative pin（－） （2） AC pin (～)



（4） AC pin (～) （3） Positive pin （+）

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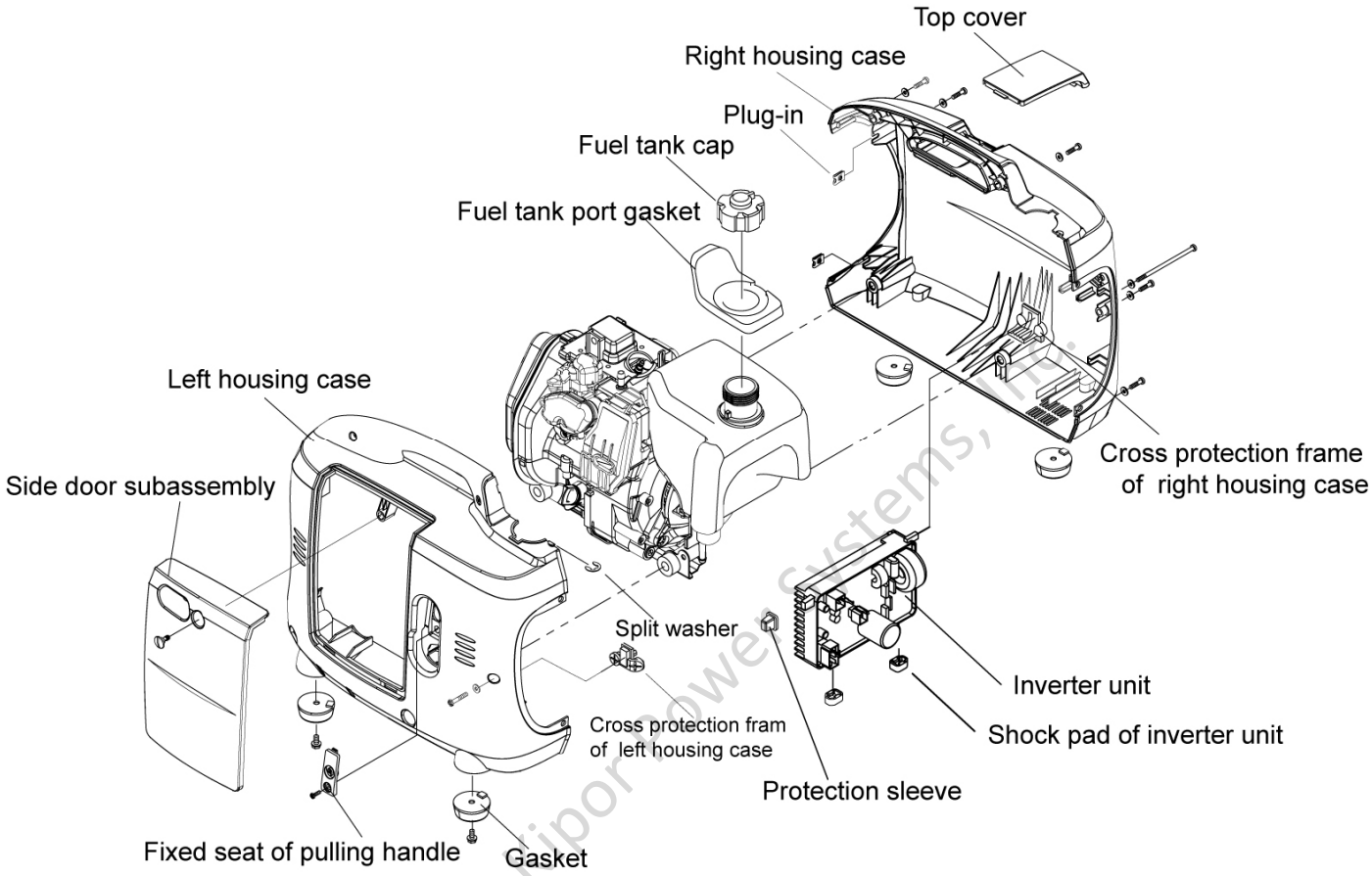
8. Housing / Fuel tank

8.1 Housing disassembly and reassembly



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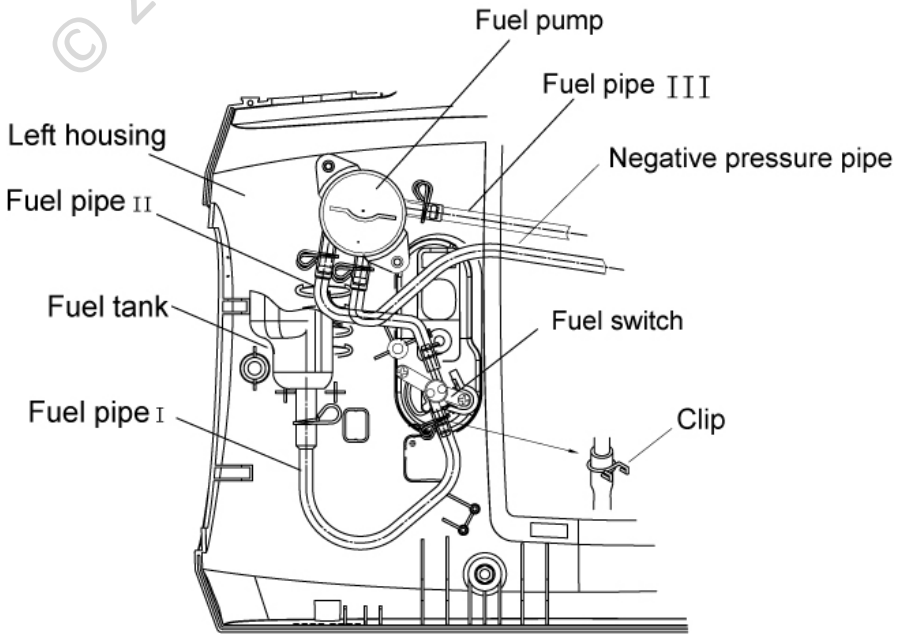
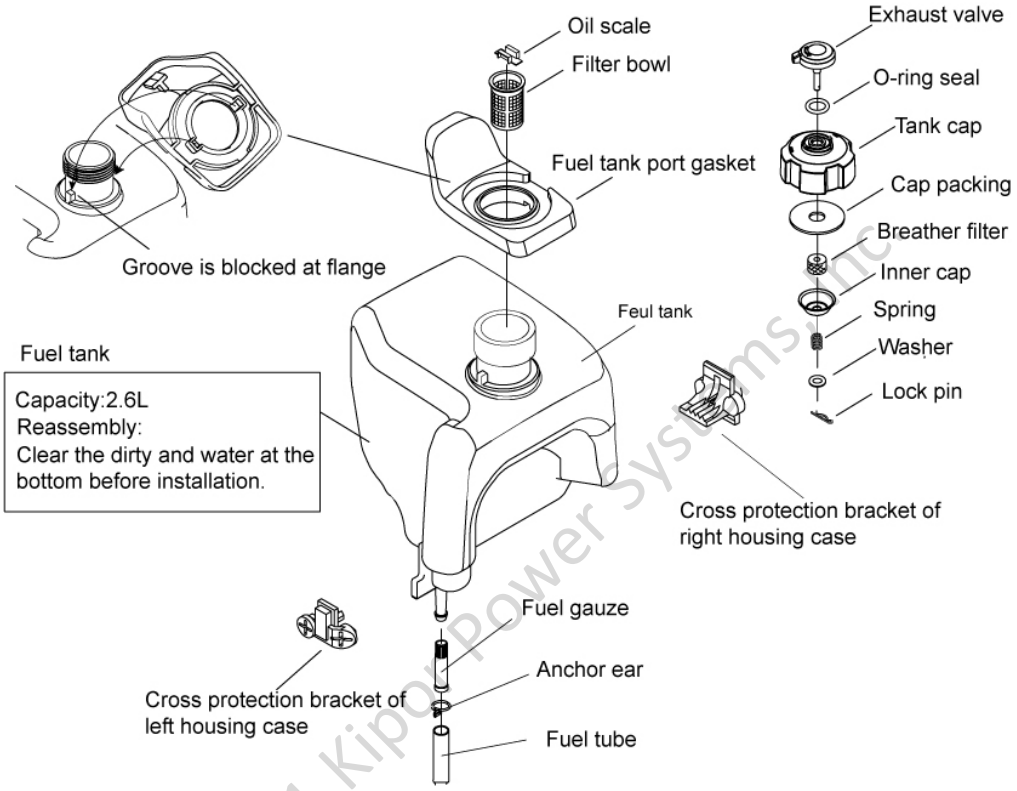
● **Left housing case**



8.2 Fuel tank assembly

Caution

■ Gasoline is highly flammable and explosive. You can be burned or seriously injured when handing fuel. Keep heat, sparks, and flame away. Wipe up spills immediately. Loosen the drain screw to drain the carburetor thoroughly before removal.



]

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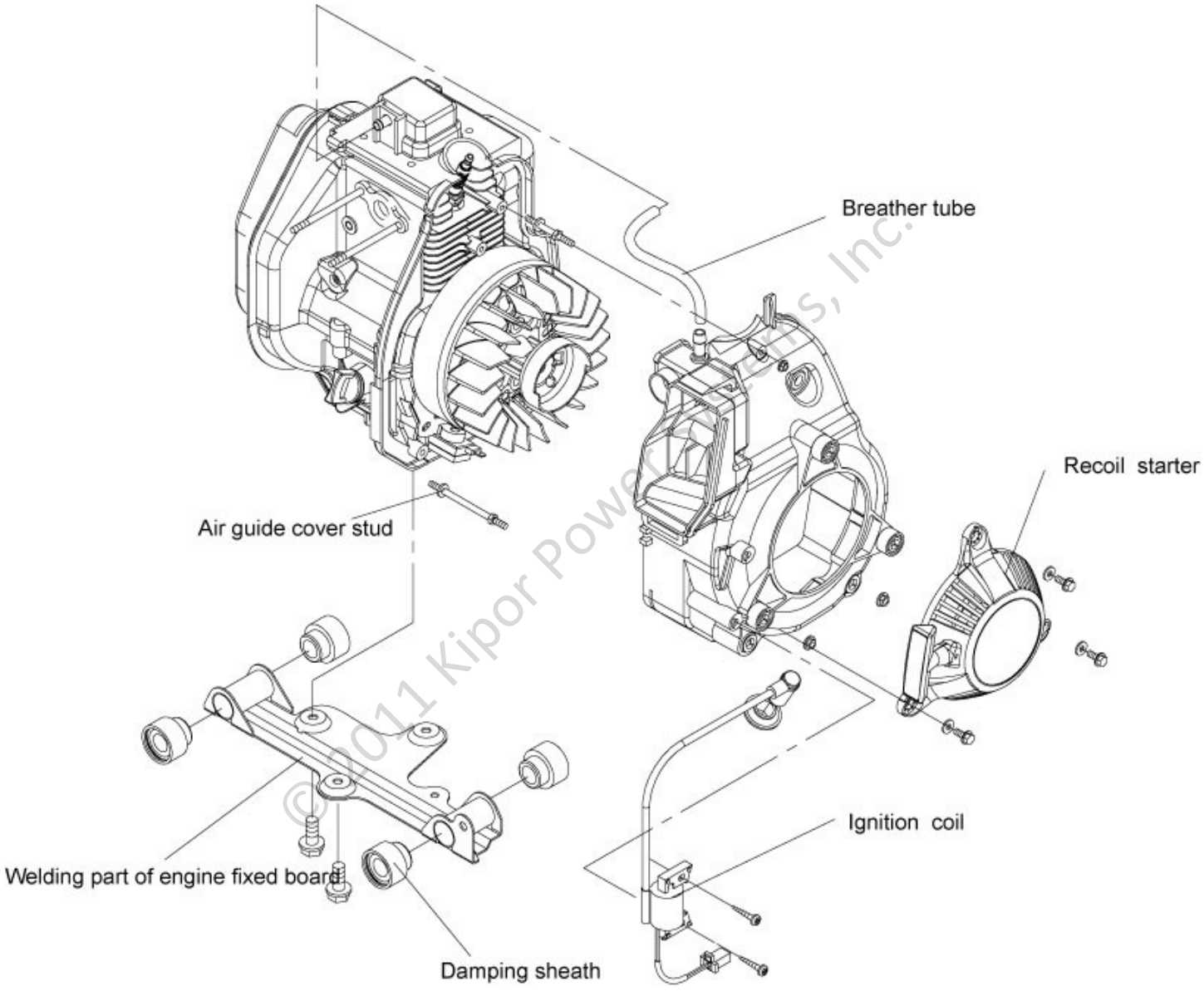
9. Recoil starter/ Air conduct cover/ Ignition coil/ Air conduct plate

9.1 Disassembly/Reassembly



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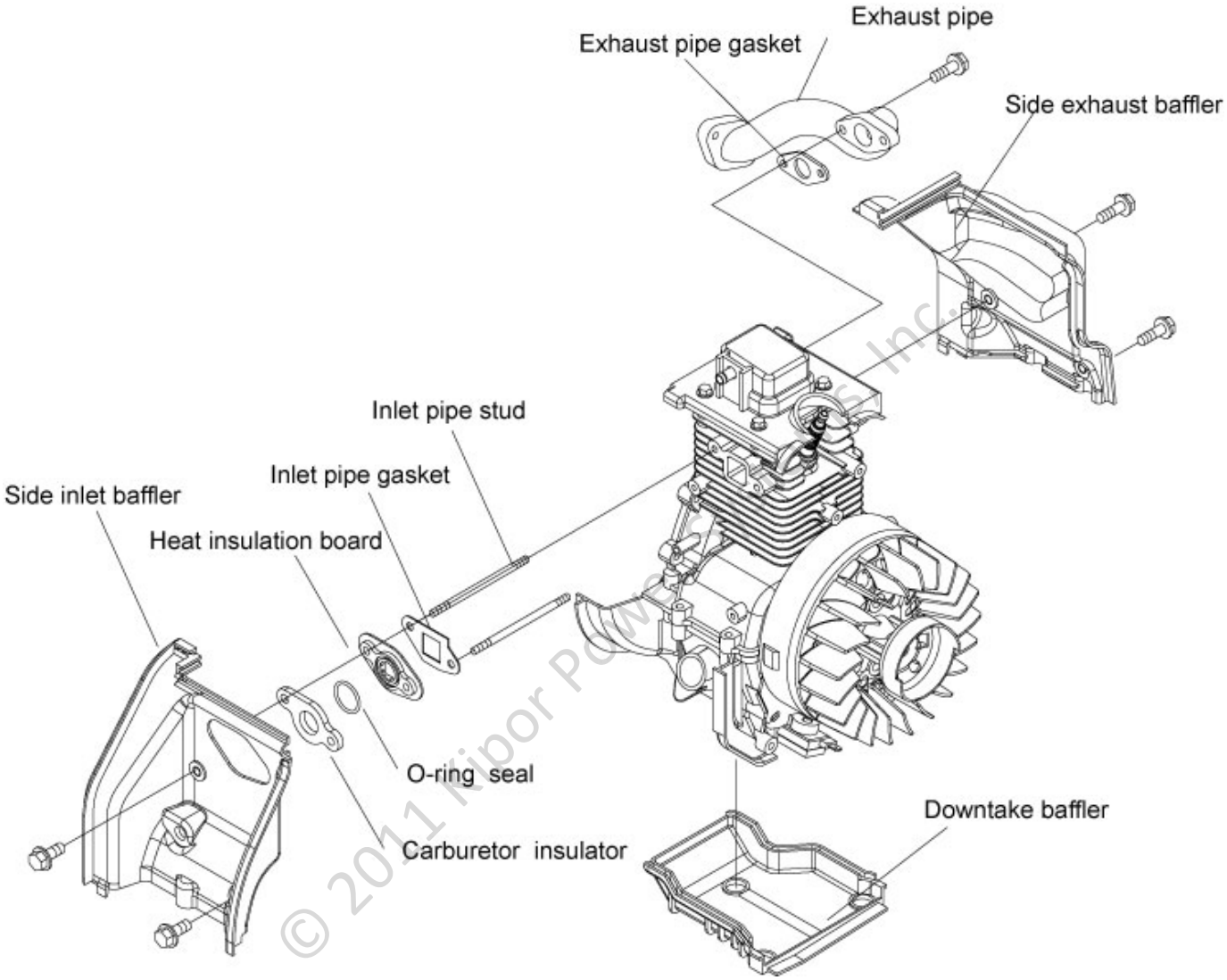
9.2 Air conduct plate

Disassembly/ Reassembly



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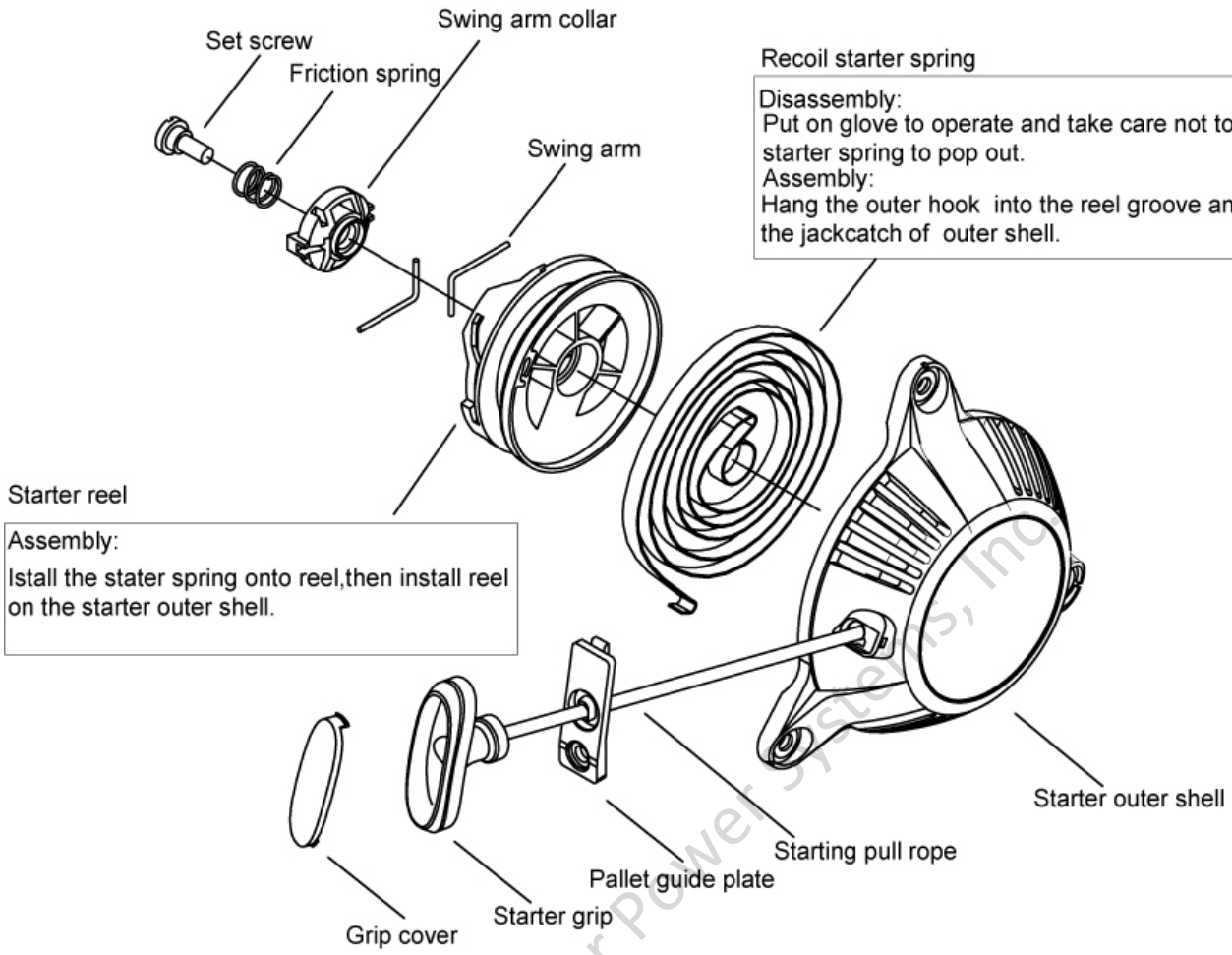
9.3 Disassembly and reassembly of recoil starter


Set screw
Friction spring
Swing arm collar
Swing arm
Recoil starter spring
Disassembly:
Put on glove to operate and take care not to allow the recoil starter spring to pop out.
Assembly:
Hang the outer hook into the reel groove and the inner hook on the jackcatch of outer shell.
Starter reel
Assembly:
Istall the stater spring onto reel,then install reel on the starter outer shell.
Starter outer shell
Starting pull rope
Pallet guide plate
Starter grip
Grip cover

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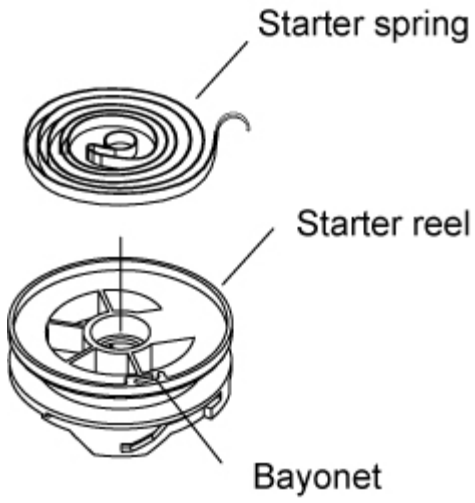
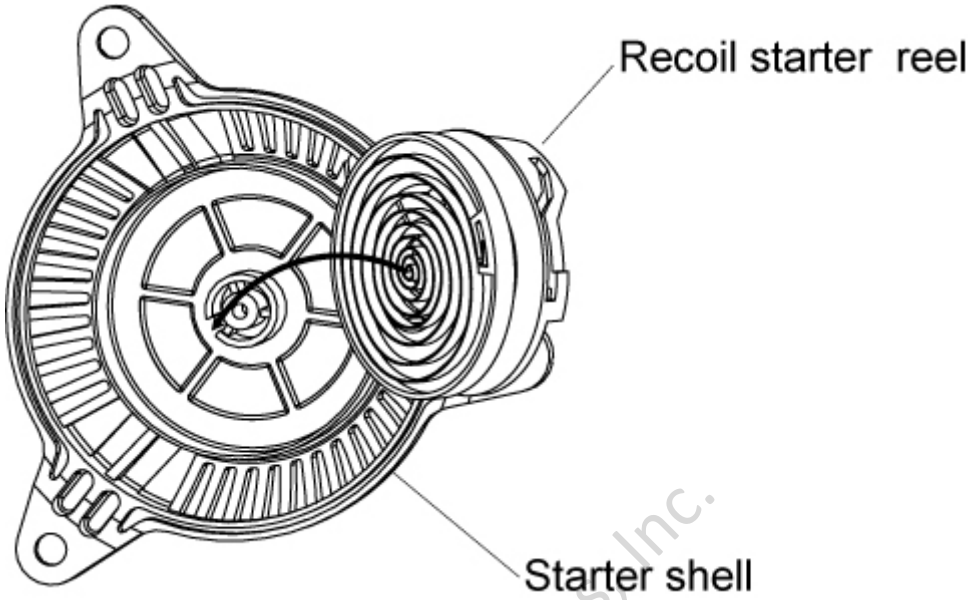
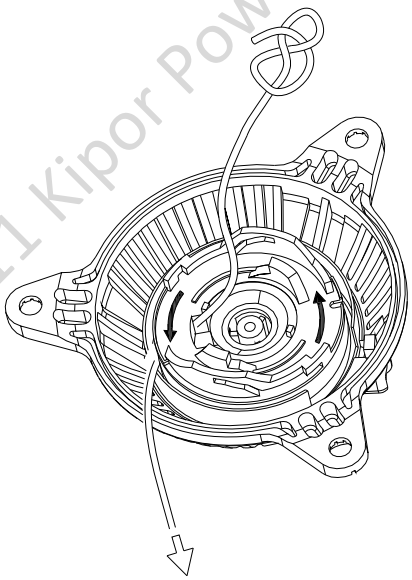
(1) Set the spring into the starter reel, and hang the spring outer hook inside the reel groove.



(2) Smear lubrication grease on the starter outer shell claw, install the starter reel. Revolve the reel anticlockwise to hang the spring inner hook on the starter outer shell claw.



(3) Make a “8” knot at one end of the rope, pass the other end through the reel hole. Wind the reel anticlockwise 6 turns to fix the reel.



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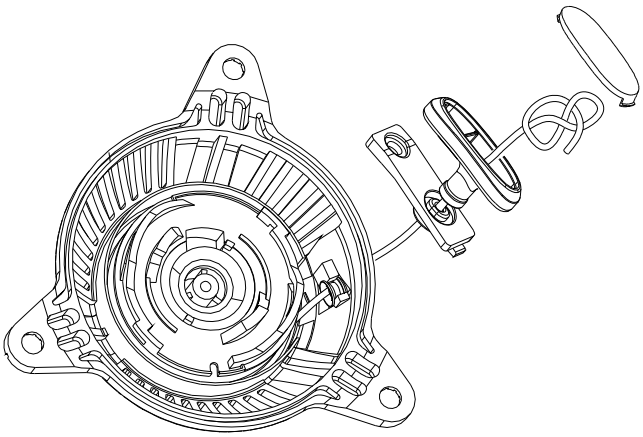
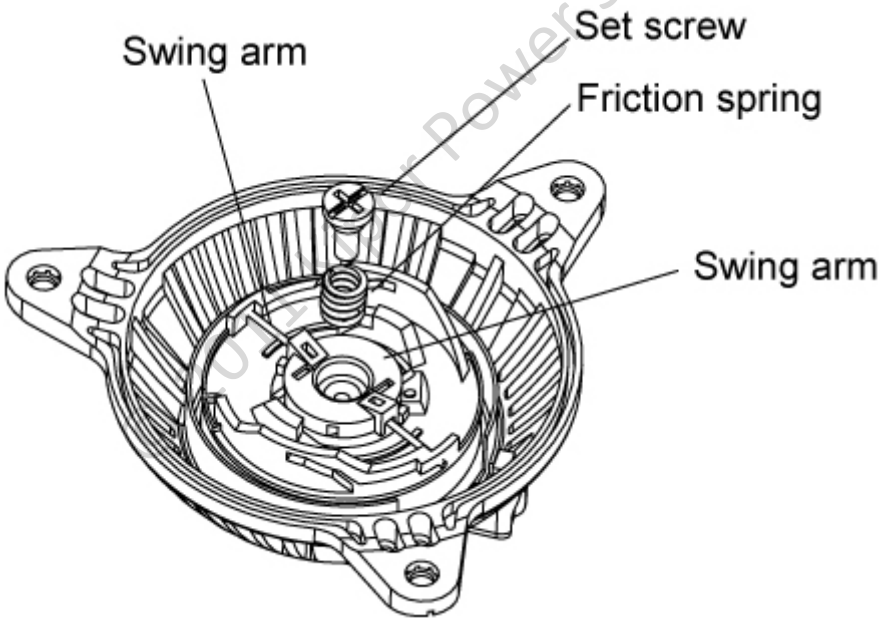
(4) Pull rope through from starter outer shell hole completely; pass it through the handle and make a figure eight knot, then turn off handle cover. Loosen the reel to release tension on the spring taking care not to allow the reel to pop out.



(5) Install the revolving axis, revolving axis parts and friction spring, fix it with bolts.



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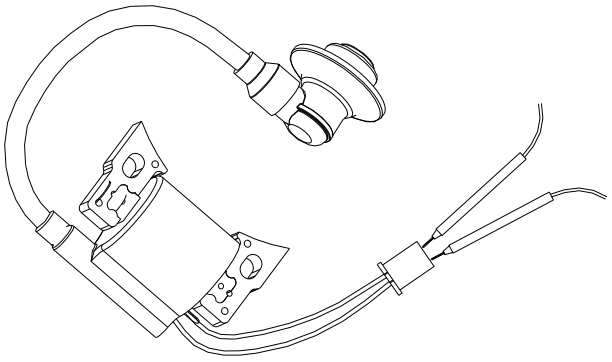
(6) Pull the starter for several times, and check the revolving axis.

9.4 Ignition Coil

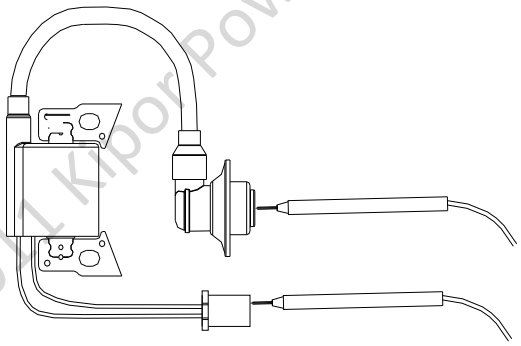
● Attach the two leads of tester to the primary coil plug of ignition coil, and measure the primary resistance of the ignition coil.

Primary resistance	0.8—1.3Ω



● Attach one lead of the tester to each terminal of primary coil plugs of ignition coil and the other lead to the spark plug cap，then measure the secondary resistance of the ignition coil.

Secondary resistance	15—21kΩ



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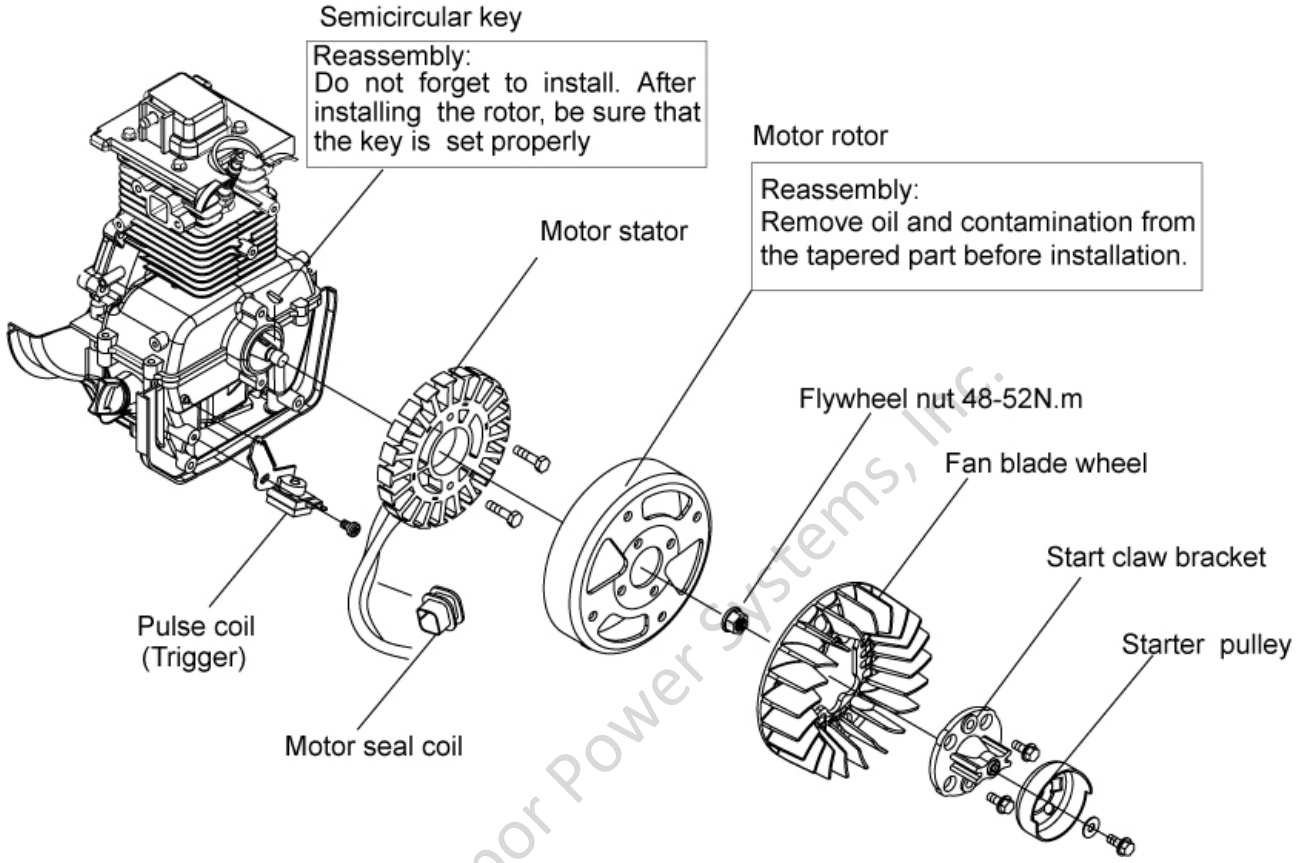
10. Alternator/Trigger

10.1 Alternator

Disassembly/Reassembly



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10.2 Inspection

(1) Ignition winding

Measure the resistance between the green terminal and yellow/green terminal.

Resistance	0.50-0.70Ω

(2) Outer charging winding

Measure the resistance between the two blue terminals.

Resistance	0.12-0.15Ω

(3) Sub winding

Measure the resistance between the two sub winding terminals.

Resistance	White-white	0.25~0.35Ω

(4) Main winding

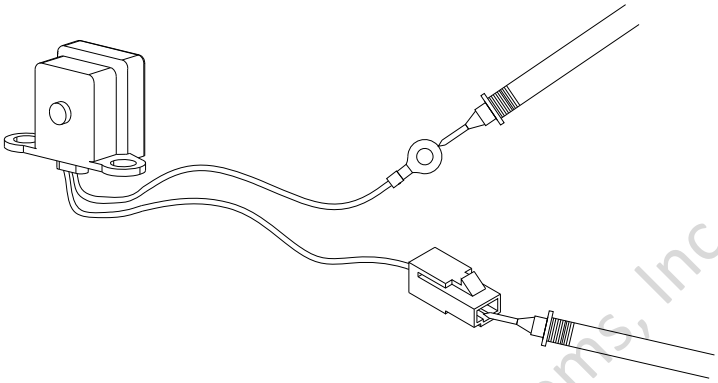
Measure the resistance among the terminals of the main winding.

Resistance	Black-black-black	2.0~3.0Ω

(5) Trigger

Attach the two test leads to the trigger and measure the resistance.

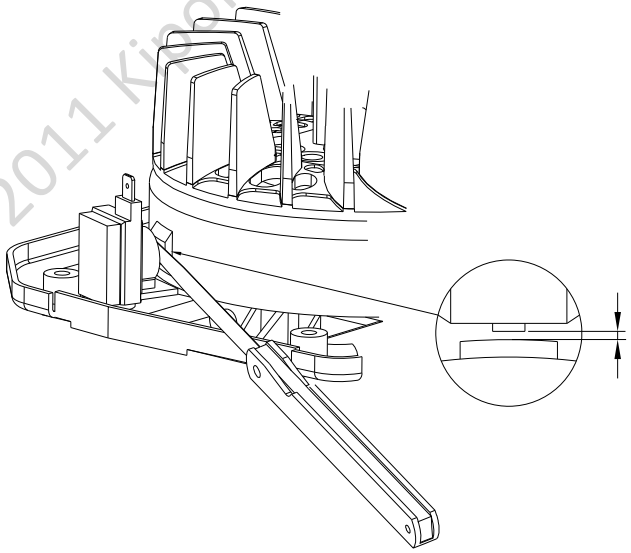
Trigger resistance	80-130 Ω



10.3 Trigger adjustment

Adjust the clearance between trigger and the projection of the rotor.

Trigger clearance	0.0197-0.0275 in (0.50-0.75 mm)



Insert a feeler gauge between the trigger and the projection of the rotor; loosen the trigger fixed plate bolt to adjust the clearance slightly. Never move the plastic part of trigger,

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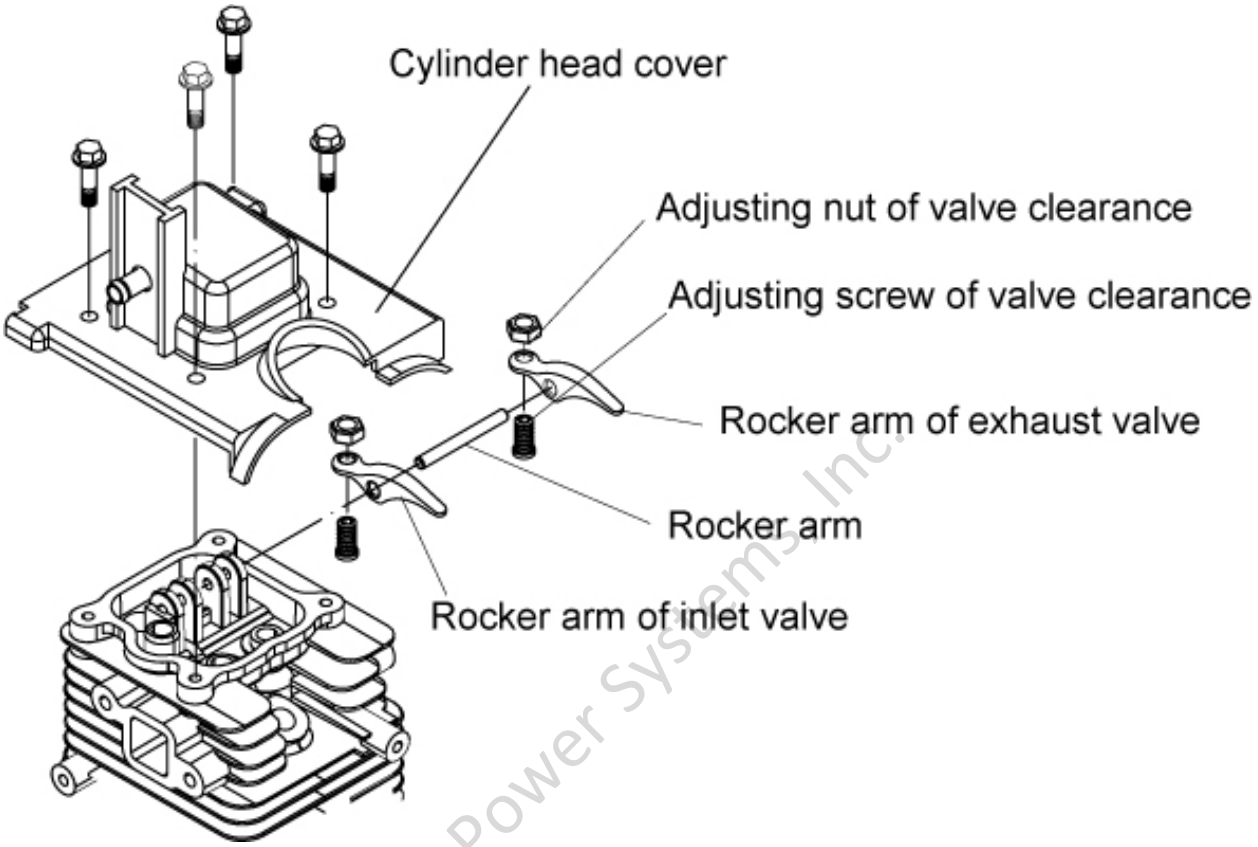
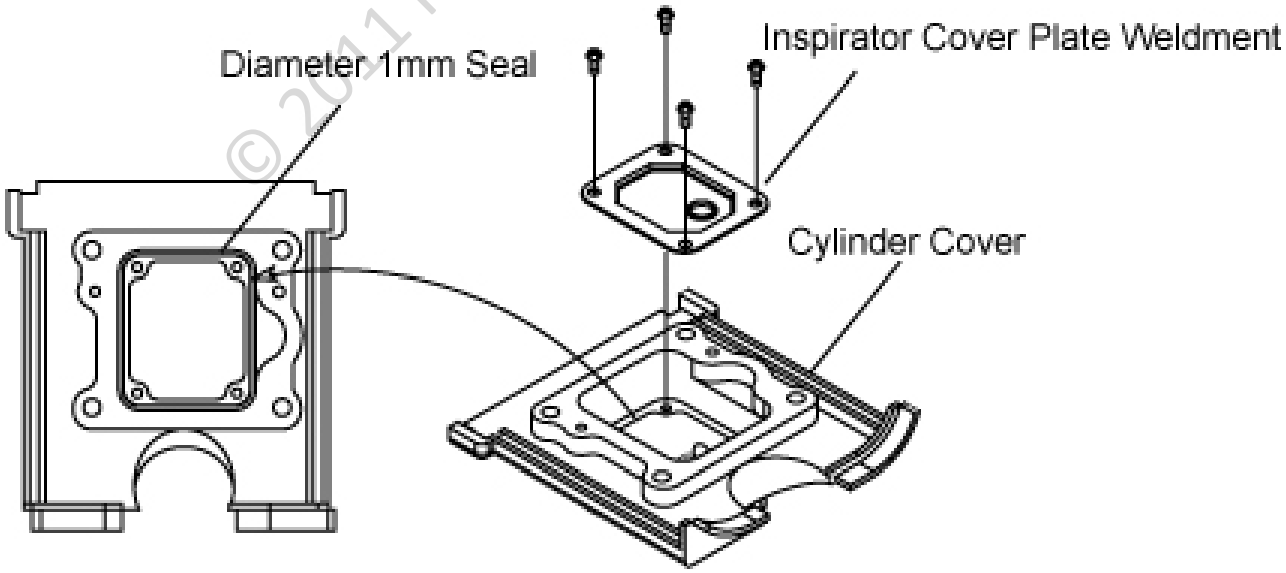
11. Cylinder cover/ Rocker arm

11.1 Disassembly/ Reassembly


Cylinder head cover
Adjusting nut of valve clearance
Adjusting screw of valve clearance
Rocker arm of exhaust valve
Rocker arm
Rocker arm of inlet valve



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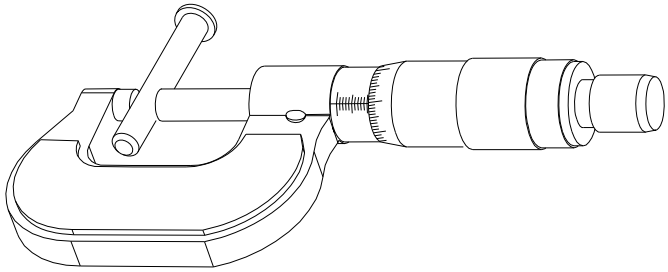
11.2 Inspection

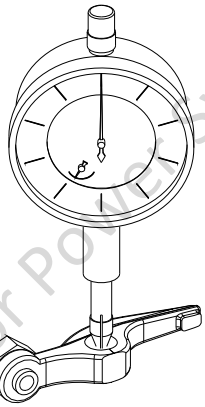
- **Rocker arm outer diameter**

Standard in (mm)	Service limit in (mm)
0.1570-0.1573 (3.988-3.996)	0.1555 (3.950)



- **Rocker arm inner diameter of inlet/exhaust valve**

Standard in (mm)	Service limit in (mm)
0.1575-0.1579 (4.000-4.012)	0.2598 (4.050)



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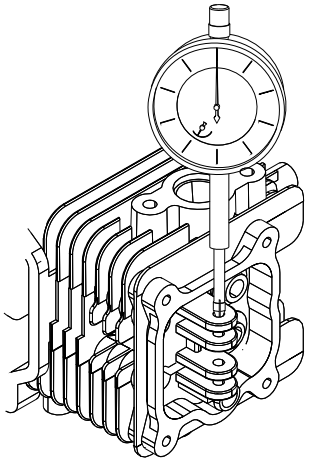
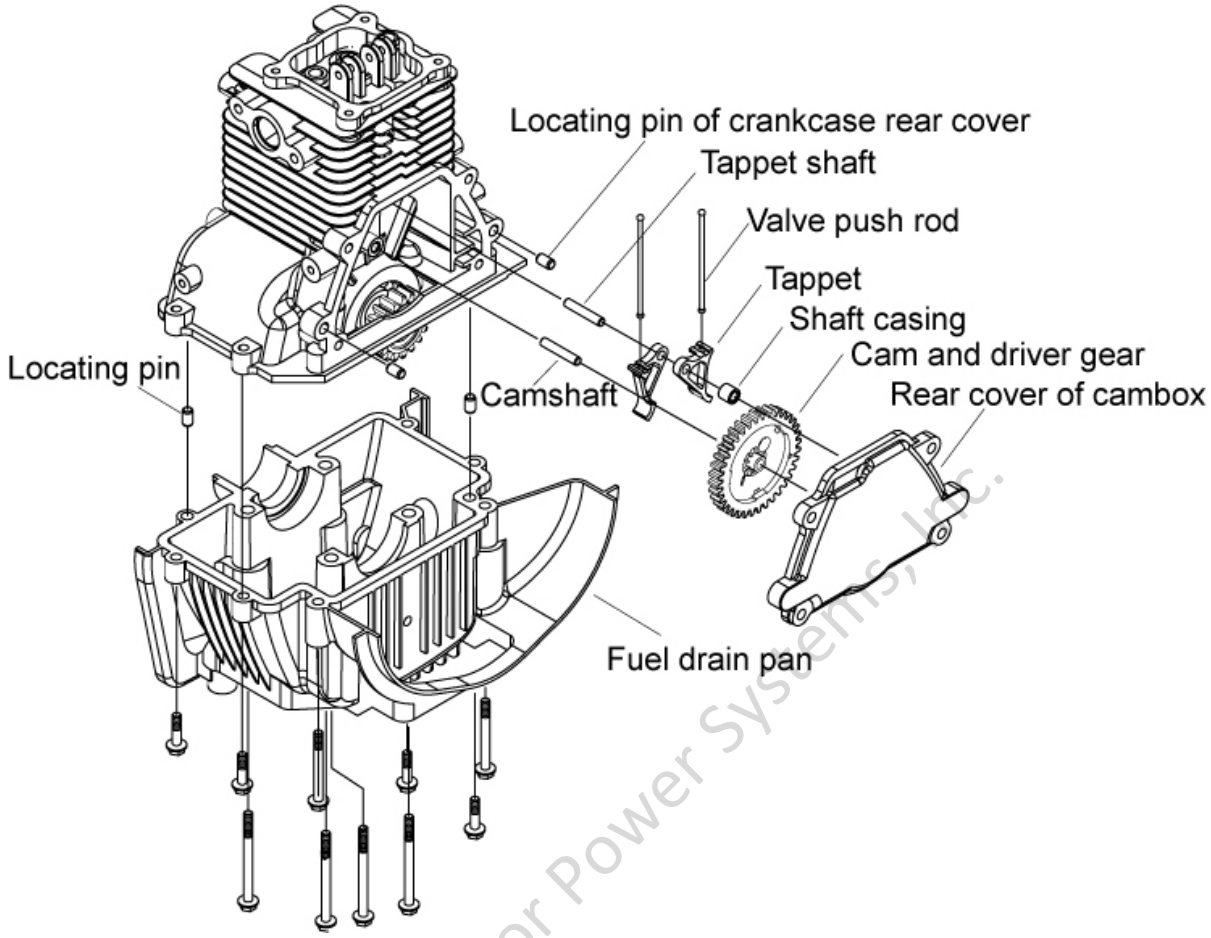
- **Inner diameter of rocker arm bearing**

Standard in (mm)	Service limit in (mm)
0.1575-0.1579 4.000-4.012	0.2598 in 4.050



12. Crankcase cover/ Camshaft drive chain

12.1 Disassembly



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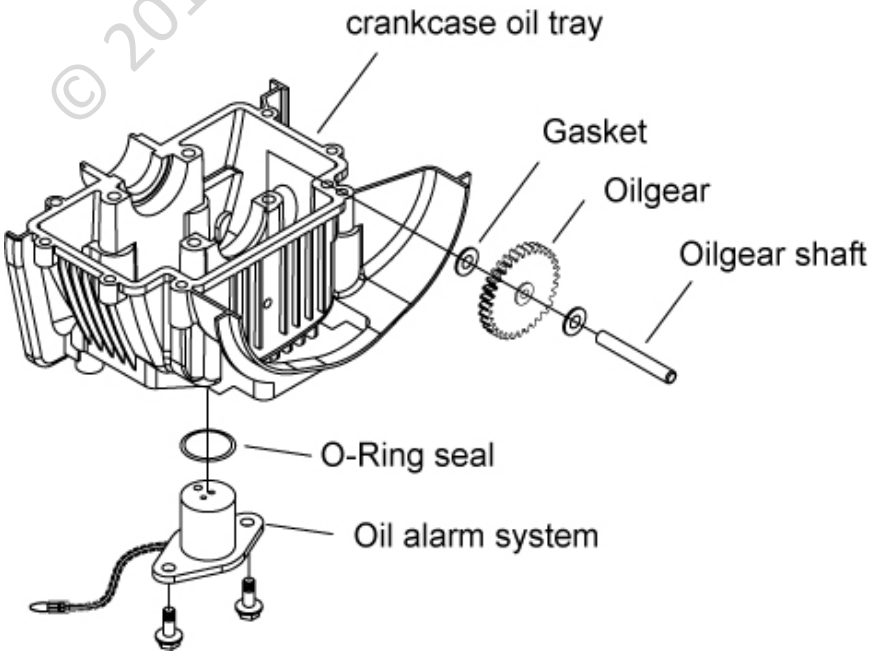
12.2 Crankcase oil tray disassembly and reassembly

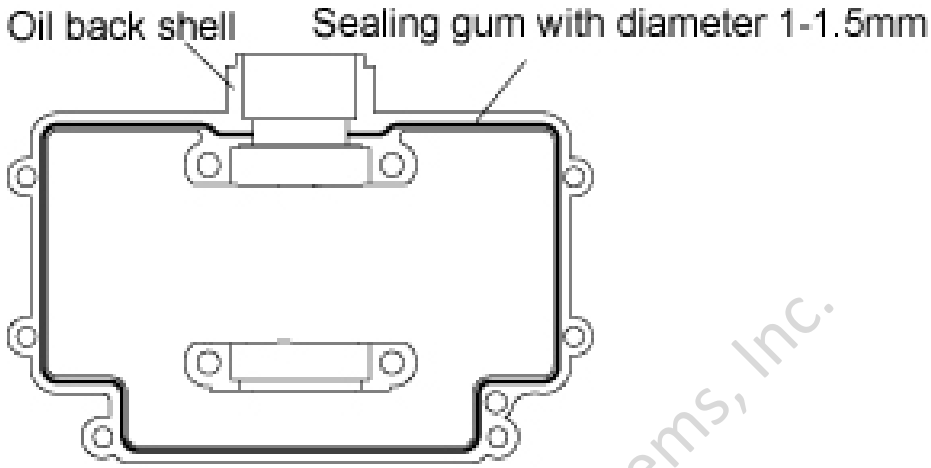


1. Clean any remaining gasket material from the cylinder block and crankcase oil tray.

2. Apply a 0.040~0.059 in (1~1.5 mm) layer of liquid gasket material [1207B or equivalent] evenly on the sealing face of the crankcase oil tray.
3. Reassemble the crankcase cover in the reverse order of disassembly.

Caution

Make sure to reassemble the crankcase oil tray three minutes after applying the gasket material.



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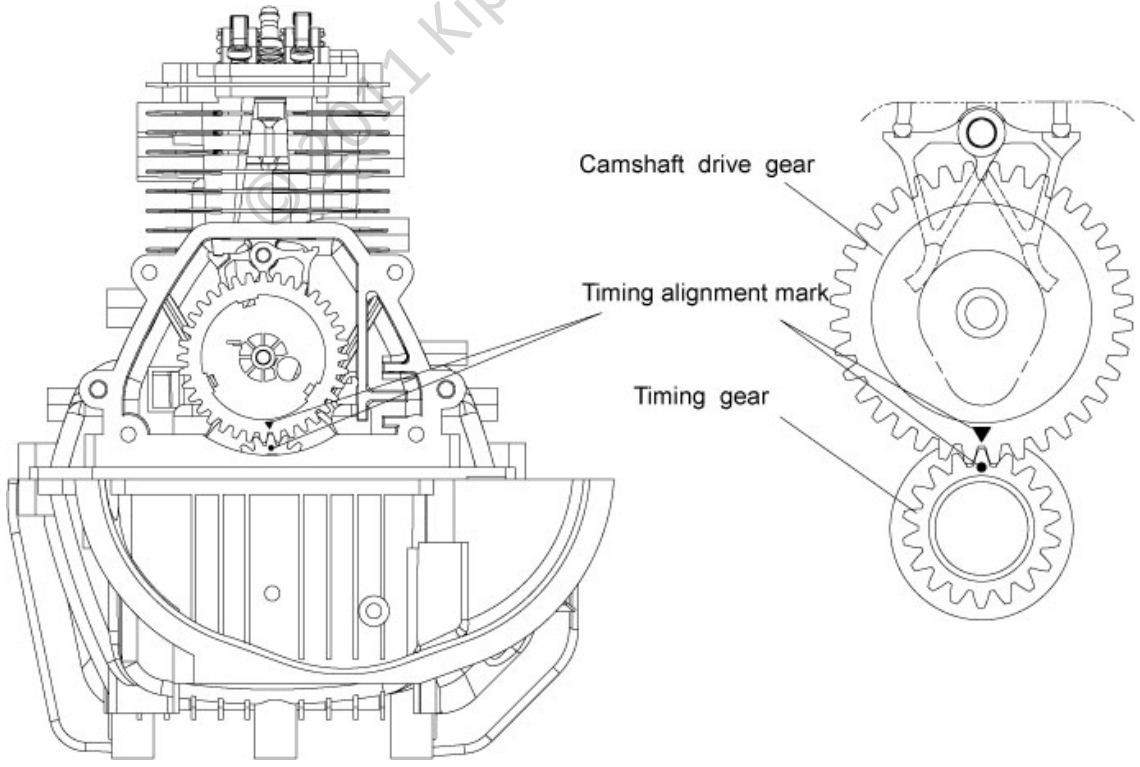
12.3 Crankshaft reinstallation

1. Revolve the crankshaft slowly, placing the timing mark pointing up.
2. Install the valve tappet, move the tappet aside and then reassemble the camshaft. Note that the timing mark on the camshaft and driving gear should be oriented downward and aligned with the timing mark on the timing gear.



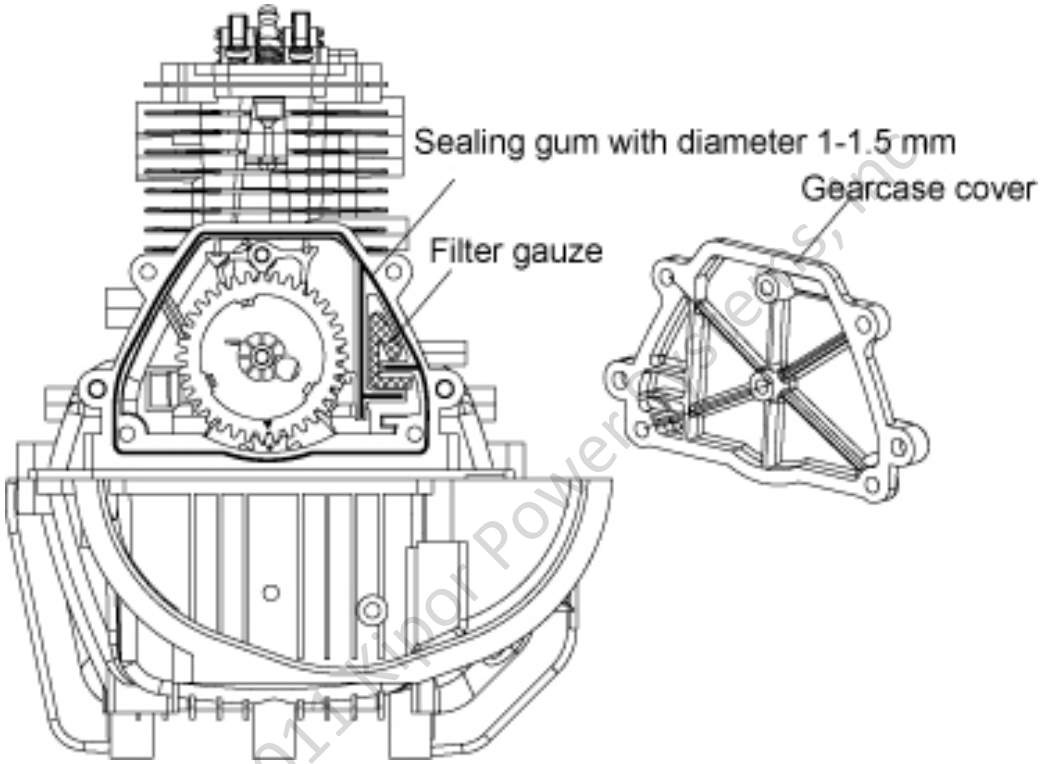
12.4 Crankcase cover assembly

1. Remove any remaining gasket material on the cylinder block and crankcase cover.
2. Apply a 0.040~0.059 in (1~1.5 mm) layer of liquid gasket material [1207B or equivalent] evenly on the cylinder block sealing face.
3. Reassemble the crankcase cover in the reverse order of disassembly.

Caution

Install the crankcase cover on the cylinder block 3 minutes after applying the gasket material.

4. Screw on the crankcase cover bolts slowly and tighten to the prescribed torque.



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12.5 Inspection

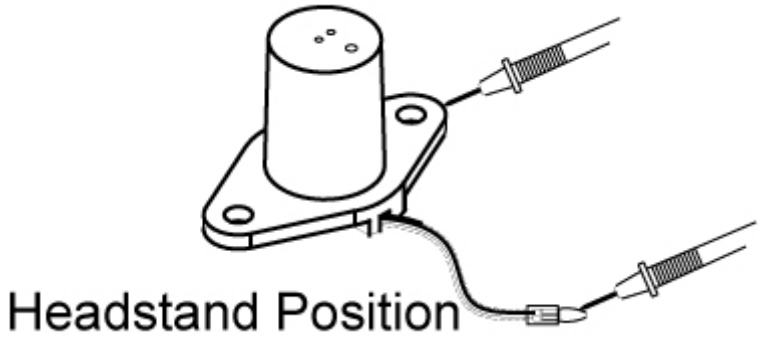
● **Inspection of the oil alarm**

(1) Place the oil alarm in the position shown below. There should be no continuity between the oil alarm output wire and copper ground wire.

(2) Turn the oil alarm 180° and check again; there should be continuity.

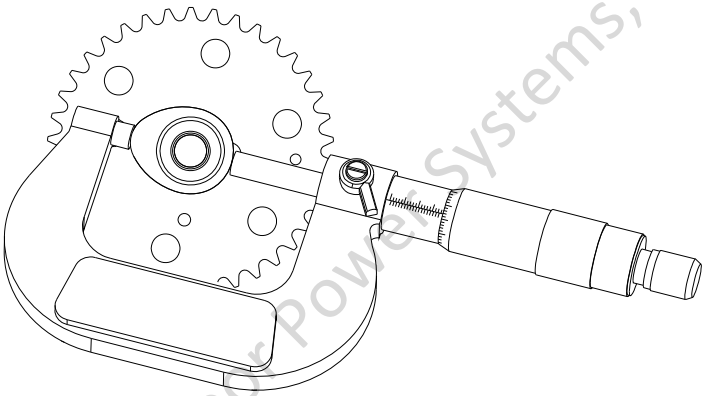
(3) Immerse the oil alarm completely in oil; check the float- there should be no continuity.

Caution: Wait two minutes after immersing the alarm in oil before measuring.



● **Cam height**

Standard in (mm)	Service limit in (mm)
1.101-1.103 (27.97-28.03)	1.062 (26.97)



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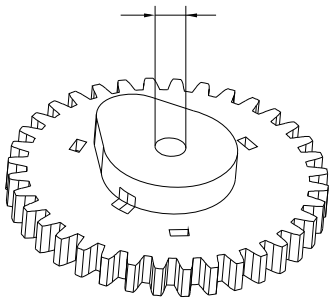
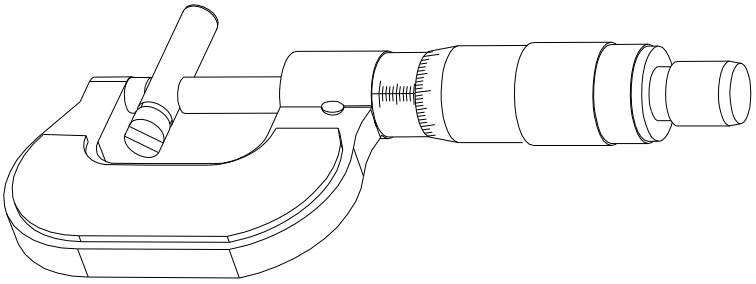
● **Cam inner diameter**

Standard in (mm)	Service limit in (mm)
0.1976-0.1988 (5.02-5.05)	0.2008 (5.10)



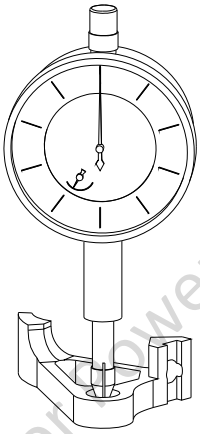
● **Camshaft outer diameter, tappet shaft outer diameter**

Standard in (mm)	Service limit in (mm)
0.1963-0.1967 (4.988-4.996)	0.1949 (4.950)



●Valve tappet inner diameter

Standard in (mm)	Service limit in (mm)
0.1968-0.1975 (5.000~5.018)	0.1988 (5.050)



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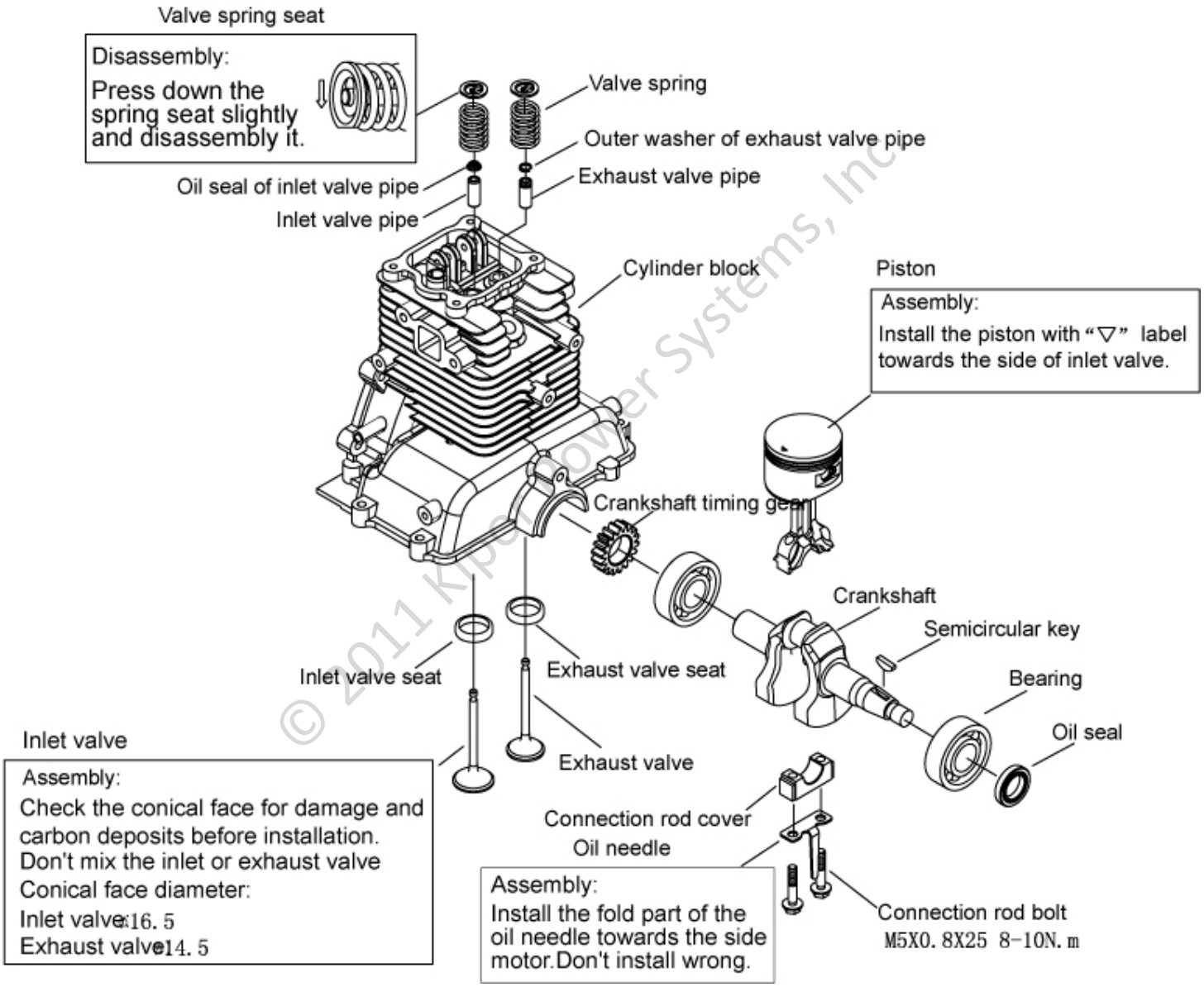
13. Crankshaft/ Piston

13.1 Disassembly/Reassembly



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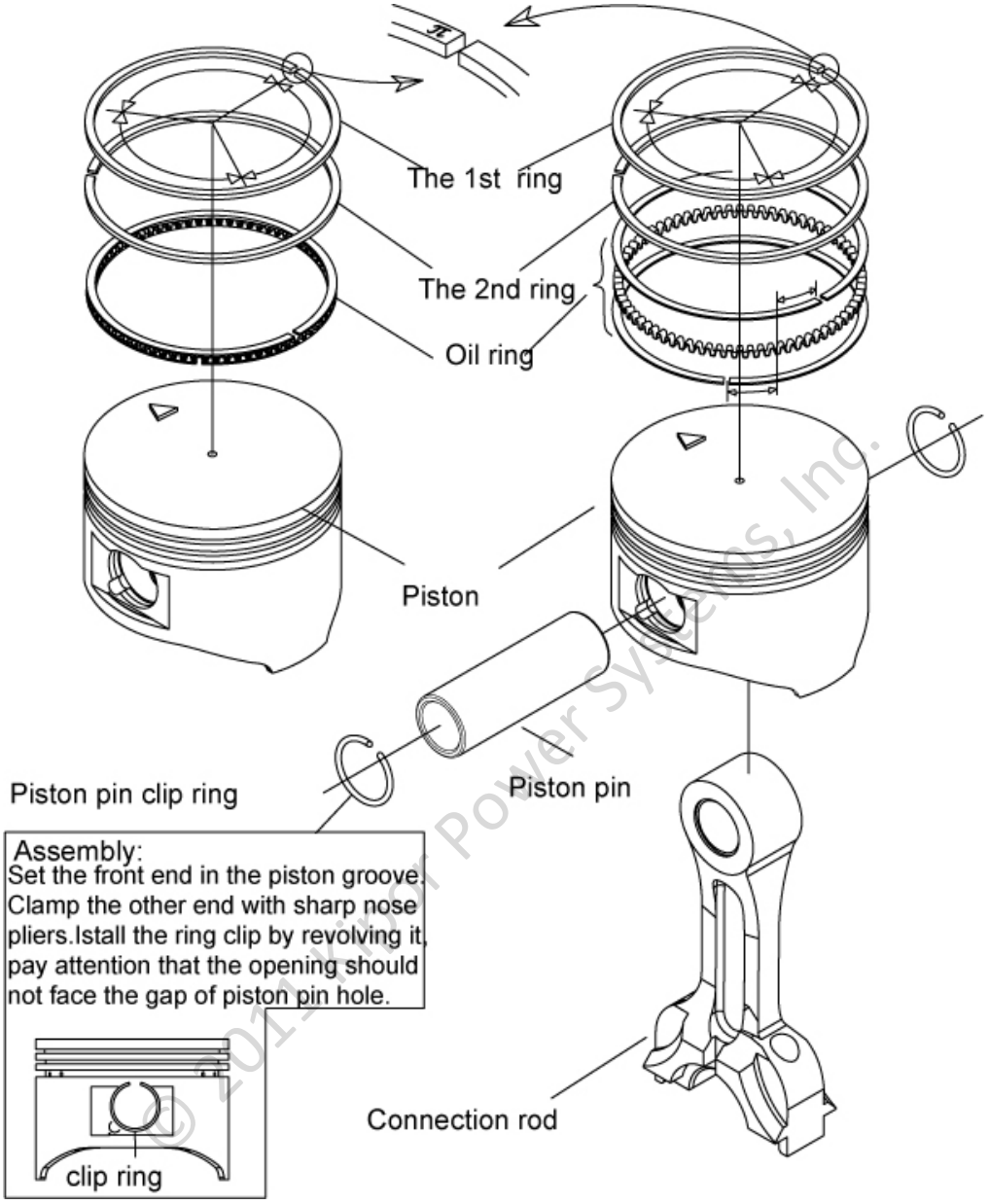
13.2 Piston


The 1st ring
The 2nd ring
Oil ring
Piston
Piston pin clip ring
Piston pin
Assembly:
Set the front end in the piston groove. Clamp the other end with sharp nose pliers.Istall the ring clip by revolving it, pay attention that the opening should not face the gap of piston pin hole.
clip ring
Connection rod

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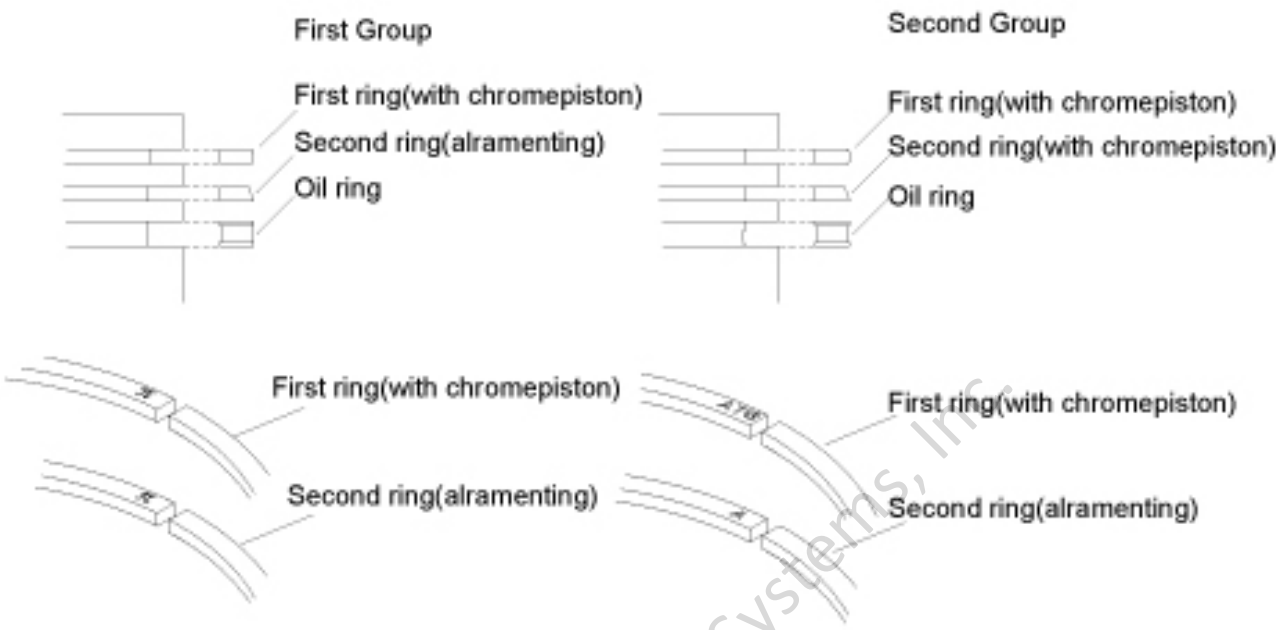
Assembly of piston ring

Caution

- Set the manufacture label up.
- Pay careful attention not to mix the location of the 1st ring and 2nd ring.
- Check the piston ring for flexibility after installation.
- Stagger each piston ring opening 120° apart.

● There may be two different kinds of piston rings for the same model generator. They can be distinguished by different manufacture labels. Don't intermix piston rings of different manufacture on the piston.



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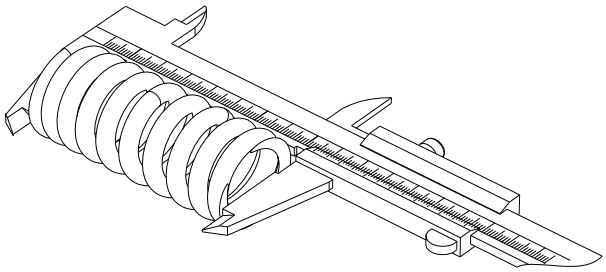
13.3 Inspection

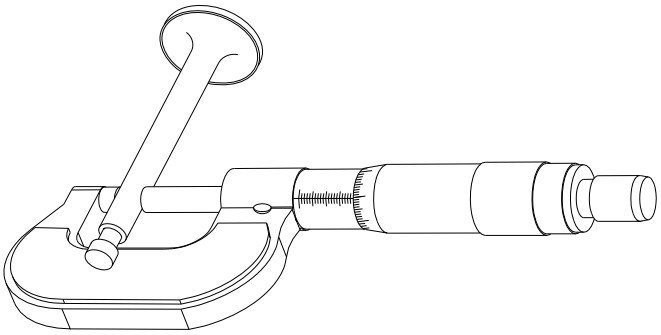
● **Free length of valve spring**

Standard in (mm)	Service limit in (mm)
0.925 (23.5)	0.866 (22)



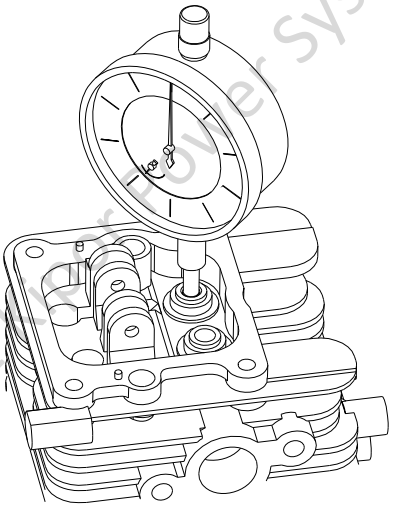
- **Valve stem outer diameter**

	Standard in (mm)	Service limit in (mm)
Intake valve	0.156-0.157 (3.965-3.980)	0.1535 (3.900)
Exhaust valve	0.1557-0.1562 (3.955-3.970)	0.1535 (3.900)



- **Valve guide pipe inner diameter**

	Standard in (mm)	Service limit in (mm)
Intake/Exhaust valve	0.1575-0.1579 (4.000-4.012)	0.2598 (4.060)



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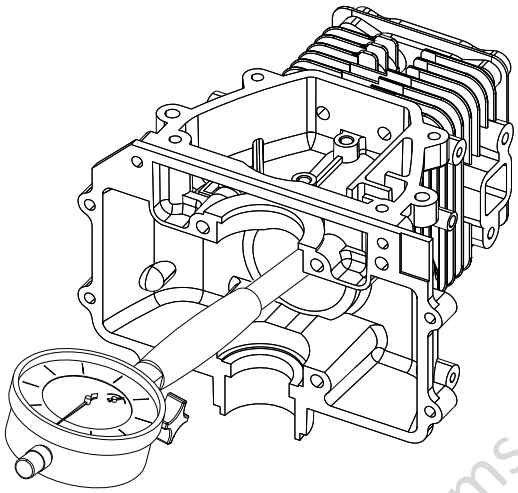
- **Clearance between valve stem and valve guide pipe**

	Standard in (mm)	Service limit in (mm)
Intake valve	0.0008-0.0018 (0.020-0.047)	.0039 (0.10)
Exhaust valve	0.0012-0.0022 0.030-0.057	.0047 (0.12)

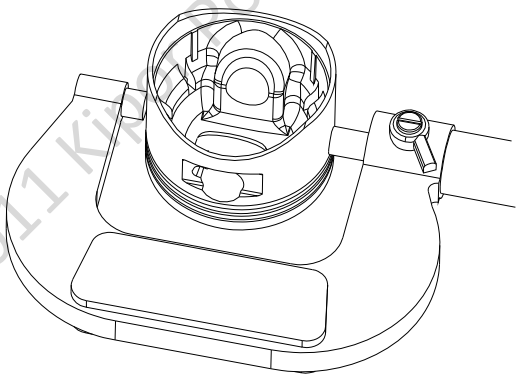
● **Cylinder inner diameter**

Standard in (mm)	Service limit in (mm)
1.712-1.714 (43.500-43.520)	1.716 (43.595)



● **Piston skirt outer diameter**

Standard in (mm)	Service limit in (mm)
1.711-1.712 (43.460-43.480)	1.707 (43.350)



● **Clearance between piston and cylinder**

Standard in (mm)	Service limit in (mm)
0.0008-0.0024 (0.02-0.06)	.0047 (0.120)

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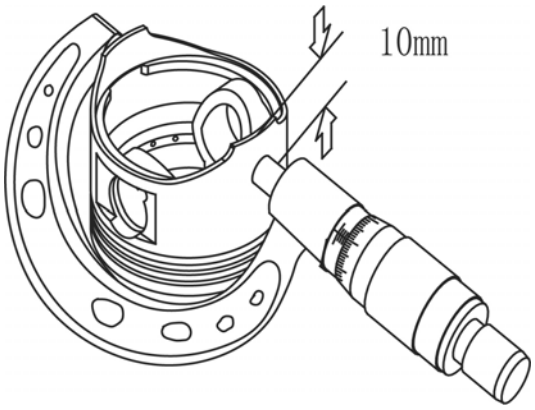
● **Piston skirt outer diameter**

Standard(mm)	Service limit(mm)
57.960-57.980	57.850

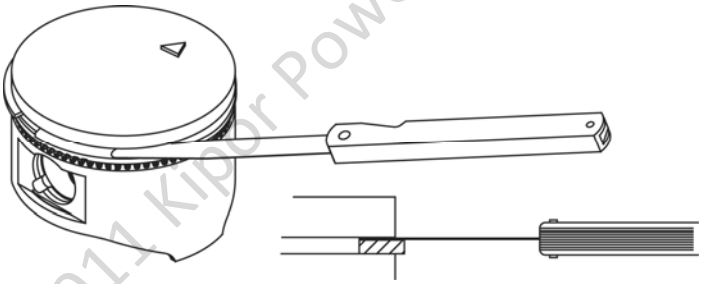


● **Clearance between piston and cylinder**

Standard in (mm)	Service limit in (mm)
0.0078-0.0165 0.020-0.042)	0.0047 (0.120)

● **Side clearance of piston ring**

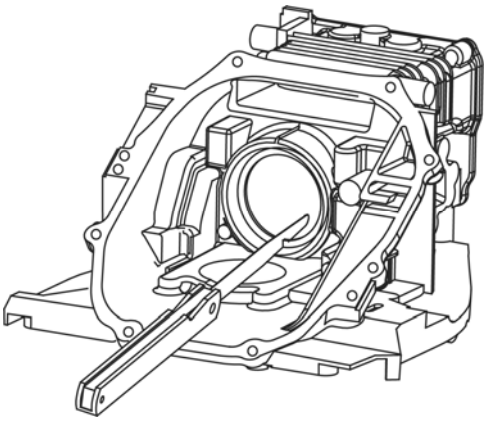
Standard in (mm)	Service limit in mm)
0.0008-0.0024 (0.02-0.06)	0.0059 (0.15)



● **Piston ring end clearance**

Locate the piston ring into cylinder with piston top, and measure the piston end clearance.

Standard in (mm)	Service limit in (mm)
0.0059-0.0098 (0.15-0.25)	0.0394 (1.0)



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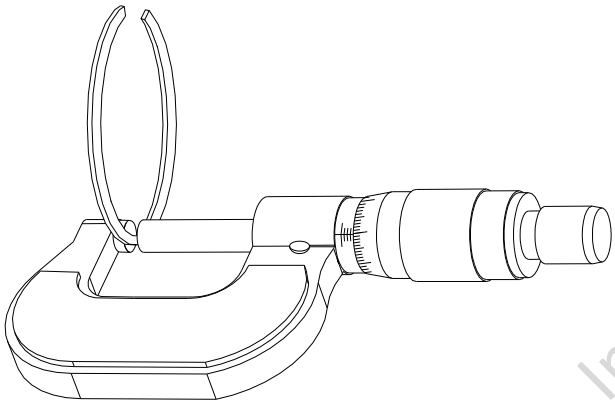
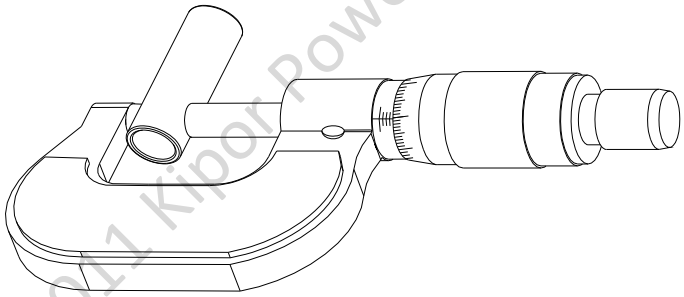
- **Piston ring height**

	Standard in (mm)	Service limit in (mm)
The 1st ring	0.0030-0.031 (0.77-0.79)	0.028 (0.70)
The 2nd ring	0.038-0.039 (0.97-0.99)	0.0354 (0.90)



- **Piston pin outer diameter**

Standard in (mm)	Service limit in (mm)
0.3934-0.3937 (9.994-10.000)	0.3920 9.950



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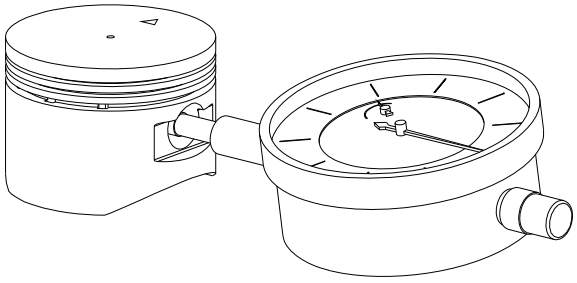
- **Piston pin bore inner diameter**

Standard in (mm)	Service limit in (mm)
0.3937-0.3940 (10.002-10.008)	0.3955 (10.050)

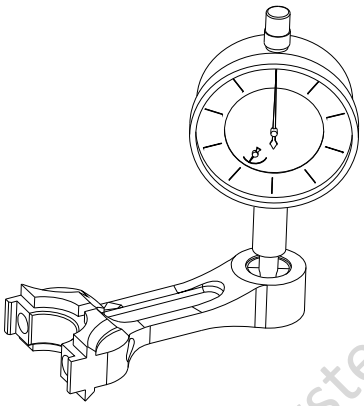


- **Clearance between piston pin and piston pin hole**

Standard in (mm)	Service limit in (mm)
0.00008-0.00055 (0.002-0.014)	0.00314 (0.080)

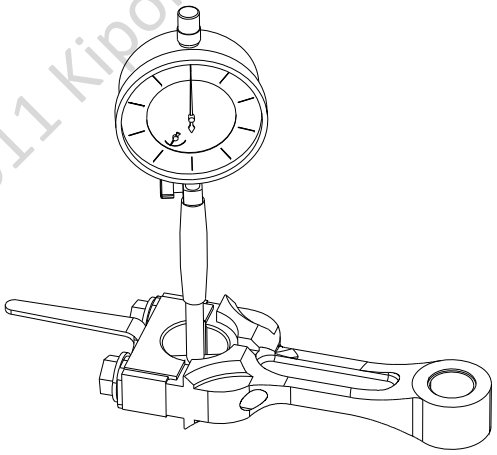
- **Connecting rod small end inner diameter**

Standard in (mm)	Service limit in (mm)
0.3942-0.3946 (10.012-10.024)	0.3965 (10.070)



- **Connecting rod big end inner diameter**

Standard in (mm)	Service limit in (mm)
0.5911-0.5915 (15.015-15.025)	0.5937 (15.080)



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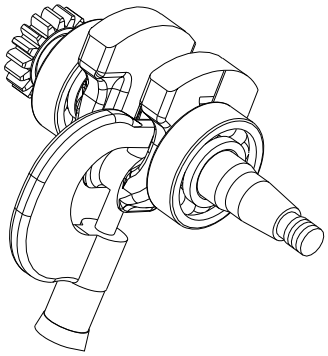
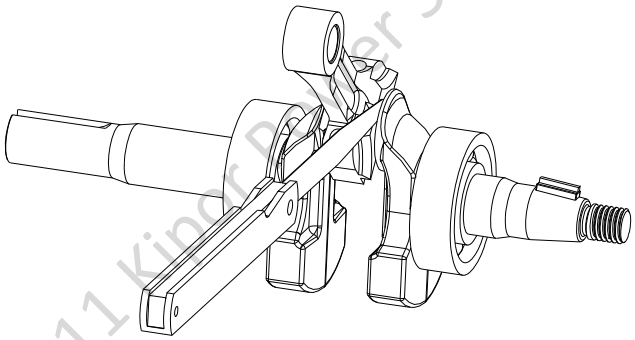
● **Crankshaft neck outer diameter**

Standard in (mm)	Service limit in (mm)
0.5896-0.5899 (14.975-14.985)	0.5866 (14.900)



● **Connecting rod big end side clearance**

Standard in (mm)	Service limit in (mm)
.0039-.0236 (0.1-0. 6)	0.0315 (0.8)



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● **Oil film clearance of connection rod big end**

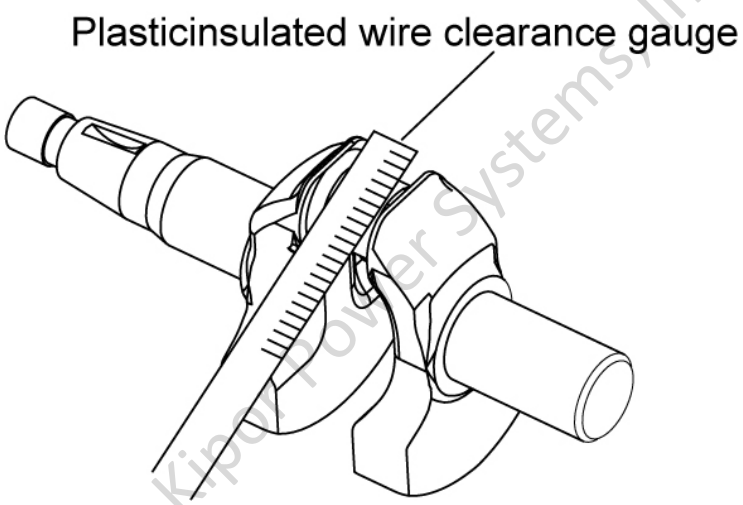
(1) Wipe all oil from the surface of the crankshaft neck.

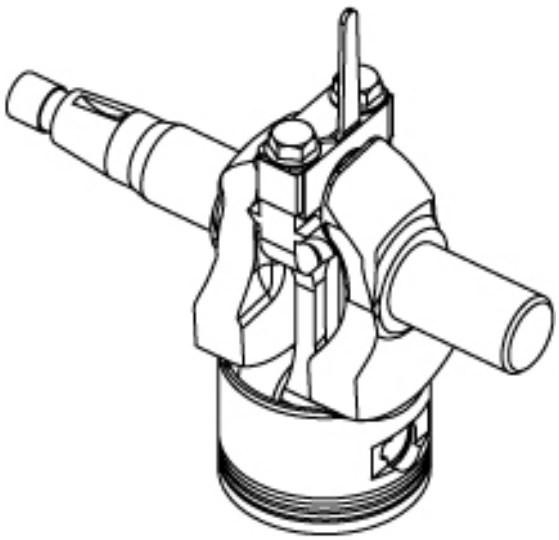
(2) Set the plastic wire feeler at the crankshaft neck and install the connecting rod. Tighten the bolt to the prescribed torque being careful not to rotate the crankshaft. The tightening torque is 5.9-7.4 ft lb. (8-10 N.m).

(3) Disassemble the connecting rod and measure the plastic wire feeler thickness.

(4) Replace the connecting rod if the clearance exceeds the service limit.

Standard in (mm)	Service limit in (mm)
0.0012-0.0019 0.030-0.050	0.0039 0.10





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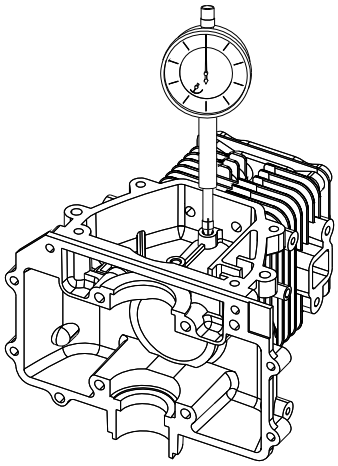
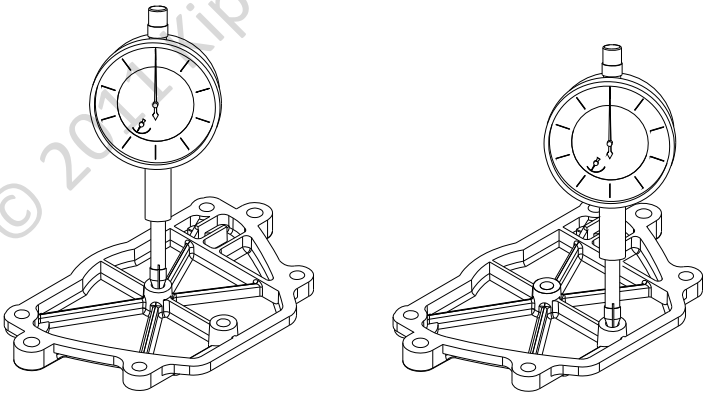
●Camshaft bearing inner diameter, tappet shaft bearing inner diameter (cylinder block)

Standard in mm）	Service limit in (mm)
0.1976~0.1988 (5.02~5.05)	0.2008 (5.10)



●Camshaft bearing inner diameter, tappet shaft bearing inner diameter (gear case cover)

Standard in mm）	Service limit in (mm)
0.1976~0.1988 (5.02~5.05)	0.2008 (5.10)



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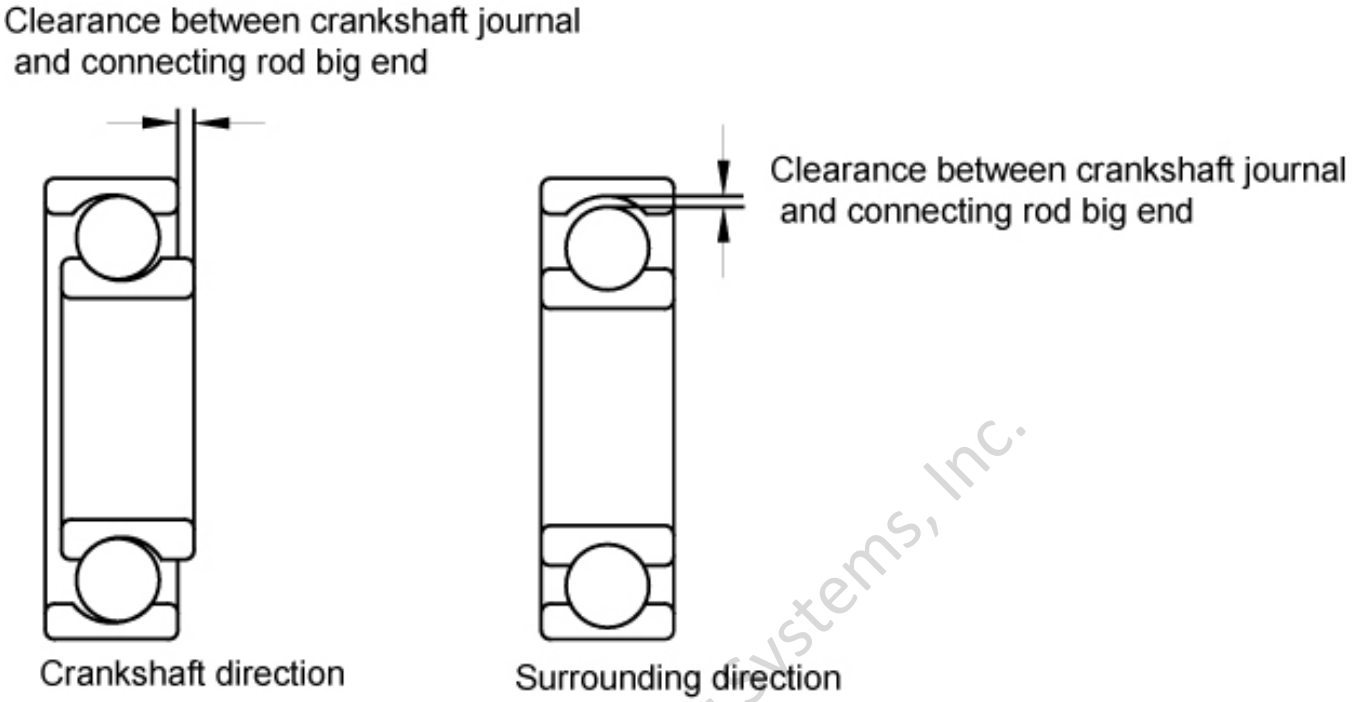
● **Bearing vibration**

Clean the bearing and dry it. check the clearance between crankshaft journal and connecting rod big end by rotating the bearing by hand. Replace the bearing if there is abnormal noise or vibration.



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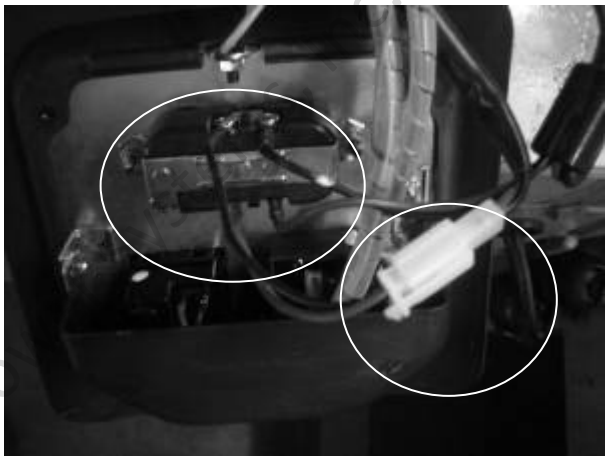
Appendix A- Capacitor

Beginning with models built in December 2007 and ending in July, 2008, a capacitor was added to reduce electro-mechanical interference and eliminate problems with some digital clocks not displaying the time properly. This was an interim solution and all later models had an inverter module modification to eliminate the capacitor.

1. LOCATION

The capacitor was placed in the output lines between the inverter and the AC receptacles. It is physically located inside the service door to the right of the oil dipstick. It is mounted on a bracket that bolts to the base plate. The base plate was modified to accept the new bracket. There is a 2p connection behind the receptacles.

Capacitor Installation



Connection to receptacle

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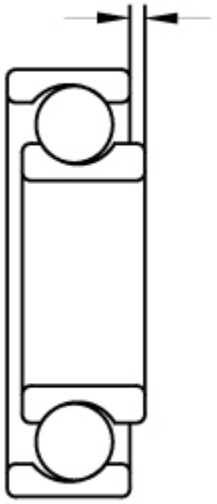
2. TROUBLESHOOTING AND TESTING

Check the capacitor when troubleshooting issues regarding digital clock displays. Should the capacitor fail, there will be no impairment of any other generator function or output. As the capacitor is connected directly to the output power supply, it has the potential to store a high voltage charge and should be discharged prior to testing. Unplug the 2p connector and short circuit the capacitor by placing the end of an insulated screwdriver across the two terminals.

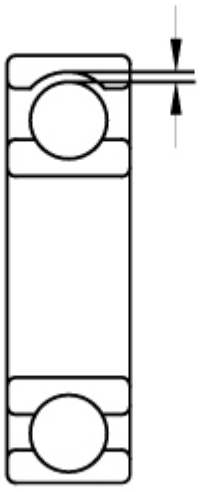
WARNING Do not touch the exposed terminals nor attempt to take any measurements before discharging the capacitor.

Use the capacitance checking mode of a multimeter. Replace the capacitor if any reading is outside the standard value of 10uF±5%.

Clearance between crankshaft journal and connecting rod big end



Crankshaft direction



Clearance between crankshaft journal and connecting rod big end

Surrounding direction

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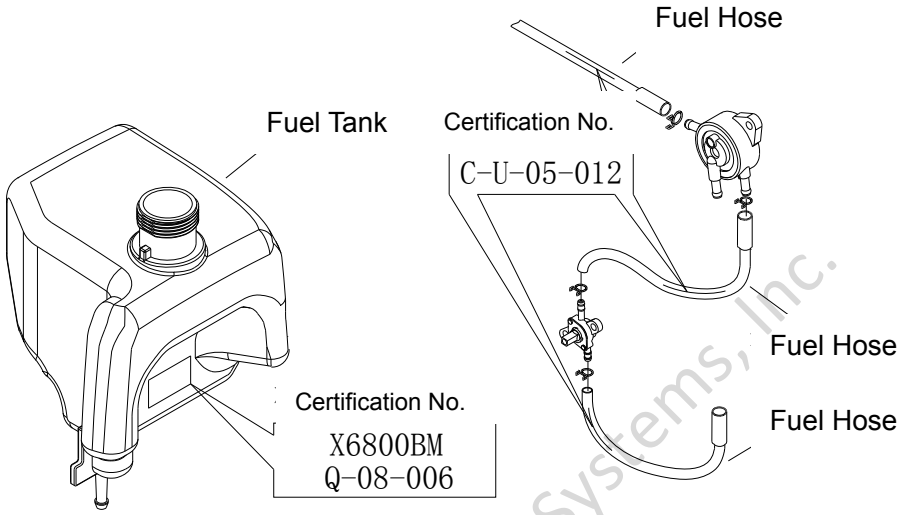
Appendix B- CARB Certified Units

The fuel tank, fuel cap, indicator, and hoses are specially designed and constructed to prevent fuel vapors from permeating and be released into the atmosphere.

The emission control system has the following components:



Other than routine inspection of the tank, cap, and fuel lines, there are no maintenance or service requirements.

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Appendix C- Parallel Operation

Beginning with the 2011 model year, an IG1000P model was introduced. The IG1000P can be connected through a parallel kit to a 2011 IG1000P, an IG2000P, or an IG2600P. Connection to an IG2000P built before 2011 is not permitted.

There are two approved Kipor parallel kits. One has a maximum capacity of 30 amps and has a single 30 amp receptacle. The other has a capacity of 50 amps and has one single 20 amp and one single 30 amp receptacle. Both receptacles are controlled by circuit breakers.

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See the operator's manual for correct operation of the parallel generators and the parallel kits.

Parallel Operation Troubleshooting

First check that both generators are operating in accordance with their output specifications. The max and rated output of both generators should be confirmed. All troubleshooting should be performed with the smart throttle in the "off position." If there is no output on the parallel panel, check the following:

Condition	Cause	Corrective Action
The output lights on both generators are green	Overload on parallel panel	Reduce load on panel Reset Circuit breakers
The output lights on both generators are green	Defective parallel receptacle or cable	Check receptacle for continuity Check parallel cables for continuity from generator panel to parallel receptacle
The output lights on both generators are green	No signal from inverter module	Check all inverter connections Replace inverter module
One or more generators is showing overload but total load is within specifications	Inverter module is not balancing loads equally among both generators	Check all inverter connections Replace inverter module

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